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# Journal of Electricity and Western Industry

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June 15, 1923

San Francisco

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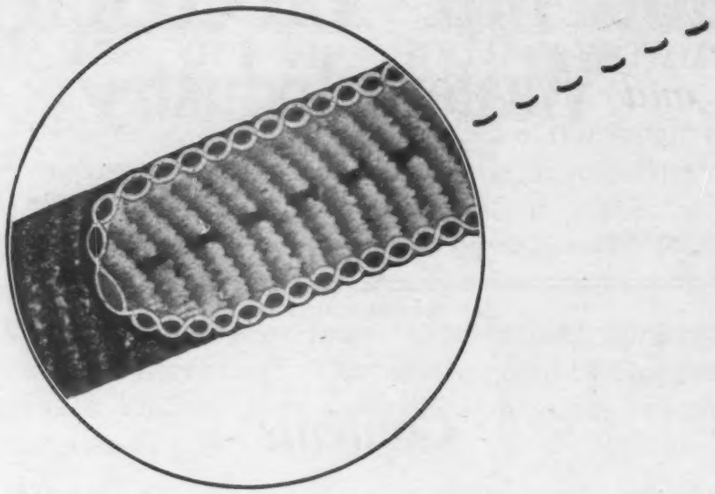

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# *The West Leads Again*

IN winning the gold medal of the Charles A. Coffin foundation for the year 1923, the Southern California Edison Company has again established the supremacy of the West in electrical development. This medal, which was awarded at the National Electric Light Association convention, just concluded, is to be awarded each year to the public utility operating company within the United States which, during the year, has made the greatest contribution to the development of the general use of electric light and power by the public and to the benefit of the industry.

EIGHTEEN electric light and power companies participated and presented reviews of their activities and accomplishments covered by the field of the award. Among the outstanding records submitted to the committee of the fund by the Southern California Edison Company were the following: tremendous gain in the number of consumers and output of electric energy during the year; the growth of the company's business, and increased efficiency in operation; establishment of department of greater service to improve public relations; the great increase in the sale and use of electric appliances, resulting in an appreciable addition to the company's revenue.

OTHER activities cited were the introduction of scientific rate schedules which permit the company to realize its fixed charges and at the same time allow the customer to obtain greater kilowatt-hour use without increased cost; the exceptionally liberal policy of the company in making extensions to consumers in rural communities; the development and operation of especially high voltage lines which have tended to improve service, and at the same time keep down investment to a minimum; very marked increase in the efficiency of the company's employees, and in the reduction of cost in handling customers' accounts; improved construction methods which have tended to reduce the number of interruptions to service, and improved methods of operation, assuring flexibility in distribution and greater reliability of continuity of the company's service; and the greatest increase in the number of shareholders obtained by any electric utility company in the United States.

IN common with other western companies, the Edison organization's success is due to two dominant conditions; first, the high public regard due to the sincere desire to serve; and second, the inherent disposition of the engineer to invade new fields and undertake the seemingly impossible. Both the public relations enjoyed by California utilities and the pioneering instincts of their engineers are matters of national comment, which will be vastly augmented by this recognition through winning the Coffin award.

IN view of wide interest taken by almost all of the large utility companies who were competitors for the gold medal, it will be recognized that the compliment paid to the Southern California Edison Company is one of unusual character, and must have been justly merited.

### Valuable Document Issued on California Hydroelectric Power Systems

WATER Supply Paper 493, just issued by the U. S. Geological Survey in cooperation with the Forest Service is perhaps the most complete, authoritative and informing document ever issued on the subject of hydroelectric development. The book, which deals with the hydroelectric power systems of California and their extensions into Oregon and Nevada, was written by Frederick Hall Fowler, formerly District Engineer of the U. S. Forest Service, and now consulting engineer of San Francisco.

Prior to its publication no single work gave a complete description of all of the systems serving the state, and those who were interested in the subject were forced to search an extensive and widely scattered literature. The need for data on existing developments was keenly felt by officers of the Forest Service in 1910, when the engineering force was reorganized and new and broader water power regulations were adopted. In August, 1911, in order to obtain comprehensive data, Mr. Fowler was detailed to make the study which has resulted in the volume just published.

The report was considerably larger in scope than first planned, and now comprises the available information on the history, markets, electric systems, finances and rates of each of the operating hydroelectric companies in the state and shows in outline the general conditions under which they have attained their present state of development. The work therefore represents an economic as well as an engineering study.

Over twelve hundred pages are devoted to text; the illustrations number fifty, and tables over three hundred. In addition large maps, in color, furnish an informing supplement to the text. The book is destined to occupy a prominent place on the desk of every hydroelectric engineer, and power company official in California. Mr. Fowler is to be congratulated on his clear and able presentation of his subject. The amazing amount of information made readily accessible cannot but arouse admiration in anyone familiar with the magnitude of the task involved.

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### Heating Specialist Holds that Home of Future Will Be Heated Electrically

"ANY one connected with the electrical industry who fails to recognize the possibility of electric heat as applied to the home will be soon left behind in the march of progress," said an exponent of electric heating before a recent gathering of electrical men.

In his talk, which was in the nature of a prophecy, he stated substantially, "that successful electric heating of homes in the future will depend on the intelligent design and construction of homes, together with the proper selection and installation of heating devices. Homes will be constructed to eliminate as far as possible thermal losses through the walls and windows. In cold climates vestibuled doors with accurately controlled ventilation and temperature will provide against excessive losses.

"Homes will be arranged for the thorough thermal insulation of hot water conductors together with the proper location of hot water storage equipped with automatic water heaters and economy hot storage limiting valves."

Indeed it would seem that with built-in electric cooking equipment in the kitchen and a segregation of living quarters from mere storage space; with small dressing rooms, and an adequate capacity in electric heaters installed with temperature controls and time switches, the electric home of the future will provide the maximum of comfort and convenience.

In any case electric heating is growing in some sections of the West and will grow as fast as our public service companies can take care of the load. When railroads quit hauling coal and oil, for their own use, and immense power plants of high efficiency are located at the source of fuel supply and falling water, the production of electric energy will grow faster than operating expense and fixed charges—then why, electric heating being possible today, should it not be popular in the future?

---

### To What Extent Shall the Public Utilities Advertise?

"SHALL the modern, progressive public utility corporation depend, in its effort to hold public good will, upon the chance that periodicals will either be willing to write frequent articles about it or accept articles from its press agents for free insertion, or shall it buy advertising space, as does the merchant and banker, to get and keep its story before the public?" This is the question which will occupy the attention of several hundred public relations men representing the leading public utility companies who have organized the Public Utilities Advertising Association, and are meeting for the first at the convention of advertising clubs at Atlantic City.

Prominent in the general display of advertising of public utilities which will be a feature of the convention, is a display clipped from more than fifty Colorado, New Mexico and Wyoming papers, which attracted widespread attention when exhibited recently in St. Louis. It will be exhibited in conjunction with the general exposition of high-class advertising, which is always an outstanding feature of the meetings of the world's foremost advertising men.

A similar request from the National Electric Light Association, which has arranged an advertising exhibit to be held at its annual convention in New York, has been made to the Rocky Mountain Committee on Public Utility Information, Denver, with which a majority of the public utility companies of the three states is affiliated. It was through the activities of the committee, which has been instrumental in promoting the use of newspaper space for advertising, that attention first was drawn to the fact that the West is far in the lead in this field.

"The public uility institutions of the three states served by this committee advertise more regularly and more often than the utilities in any other state in the nation," states George E. Lewis, manager of the information committee. "I do not refer to merchandise advertising alone; I bean 'good-will' advertising—advertising designed to acquaint the people with the affairs of their public service organizations. All over the country public utility companies are adopting the idea."

Public utilities throughout the entire West have been among the first to appreciate the business and good-will building value of a systematic and continuous advertising program.

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### A Motto Is Suggested for the Enterprising Contractor

COUNTLESS are the editorial preachments that have been written declaring that a business succeeds and prospers today only to the extent which it renders to the public a definite service. No doubt there are electrical firms which are not rendering that measure of service to the public which they should. Prominent among these are the contractors who consider price alone when figuring on a job, and who skimp on a contract in order to make a profit. That they are not only hurting themselves and their business but are lowering the plane of the entire electrical industry apparently has not been brought home to them. It is inevitable that the sour fruits of their unsatisfactory service will ultimately have to be gathered, but they cannot be reclaimed by editorial admonitions alone.

The following moto, which was taken from the wall of a small but prosperous contractor-dealer establishment in an intermountain town, has been sent to us by a correspondent:

"Count that day lost
Whose low descending sun
Finds profits shot to hell
And business run for fun."

This strikes us as an appropriate sentiment to adorn the walls of any business. We suggest its adoption by our cooperative electrical organizations and trade associations, who might well circularize their members accordingly. The sentiment expressed may be crude, but it is nevertheless true.

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### A Satisfied User is the Best Salesman

THE electrical industry in the western states is overlooking one of the greatest factors standing in the way of increased range sales, despite the strenuous efforts of central stations and manufacturers to augment the use of this major electrical appliance. As is brought out in the Commercial Section paper on "Merchandising Electrical Ranges" which is to be read before the coming convention of the Pacific Coast Electrical Association, and which was published in the last issue of the Journal of Electricity and Western Industry, the failure on the part of the men in the industry themselves to universally adopt electric cookery in their own homes is partly to blame for the indifferent reception which is being accorded range sales efforts. In this paper the authors draw an analogy between the electric range salesman whose wife uses some other form of fuel at home and the automobile salesman who calls on his prospective customers with a horse and buggy or on a bicycle. To this we would add the bald-headed barber who attempts to sell his customers hair tonic. The paper suggests that the central stations inaugurate a plan whereby an electric range may be placed in the home of every man in the company who has any dealings with the public on the subject of electric ranges. We are thoroughly in accord with such a plan. Familiarty with the superiority of electric cookery bred by experience will enable the salesman to intelligently propound the idea to his prospective customer. Knowing that the salesman himself is a user of an electric range, the housewife herself will be a more sympathetic listener. Such a practice cannot help but result in increased sales.

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As soon as we realize that electricity and the use of attendant appliances is a service and that it is this service we are buying; not just the article itself—whether it be an iron, a percolator, washing machine or house wiring—the nation will be a long way towards complete electrical conversion. It won't be long, now, before life without every conceivable electric help and appliance will be considered as hopelessly old-fashioned and impossible as it would without the conveniences of mail delivery, without the automobile, department store or any similar daily need.

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The cost of electricity decreased 2.4 per cent in the ten-year period from 1913 to 1923, according to a statement of the United States Department of Labor in its regular report on changes in the cost of living. This is the first report in which the cost of electricity is separated from the customary "fuel" and "light" item. During the same period the cost of "fuel and light" increased 86.2 per cent, the report says. The total average increase in the cost of living since 1913 is placed at 68.8 per cent; food has increased 42 per cent; clothing, 74.4 per cent; housing, 62.4 per cent, and furniture, 117.4 per cent.

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"The great rural stretches of the country challenge the electrical industry to reach out and lighten the burden of ten million farms, the backbone of the nation," states Philip Rose, editor of the Country Gentleman. "Will the electrical industry accept the challenge? I think it not only will but that it has made a most creditable start."

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"It cannot be denied that the public generally is coming to a better understanding as to the problems of the public utilities, and is beginning to realize that their interests in large measure are bound up with the success and financial stability of the public utilities supplying the necessities of life."—F. W. Smith, Pres. N.E.L.A.

# CURRENT COMMENT

**California Advertising Effiective**

Someone has said that it is the latent desire of ninety-nine per cent of the people who reside east of the Rocky Mountains to make California their future home. Proof of the truth of this statement is contained in the statements which have recently been issued by Californians, Inc., a San Francisco organization, which is engaged in telling the nation through the medium of advertising and publicity of the glories of the state in general and Northern California in particular. The campaign conducted by the organization has done more than give decided impetus to the number of tourists who annually visit the state; it is showing the United States that California offers unusual opportunity for the average man to work and make a home. Thus the campaign is proving a powerful factor in increasing the prosperity of the state by attracting to it a large flood of new population and new capital.

The advertising is being carried in 57 publications having 18,000,000 circulation and 50,000,000 estimated readers. There are three types of copy, tourist, home-seeker and settler opportunity. This copy is appearing in 18 national magazines, 7 farm magazines and 32 daily newspapers.

On May 1 at the end of the first six months of the campaign there had been received a total of 108,000 coupon and letter inquiries. Sixty per cent were general, 25 per cent were directed toward farming opportunities, 10 per cent were from home-seekers and the remainder sought information about investments, business and employment. The majority of the inquiries were from the Middle West, 48 per cent of them being directed from that section of the country. The remainder were as follows: Eastern States, 35 per cent, Northwest, 15 per cent, Foreign, 2 per cent.

A total of 149,000 letters have been sent out while 234,000 copies of the various books and pamphlets which have been prepared by the organization have been distributed. Special investigations to the number of 5,300 have been conducted for the benefit of inquirers. Railroads have received the names of 75,000 people for follow-up and have reported from 10 to 20 per cent of them travel prospects.

The organization is just completing its campaign for funds for its second year. A budget has been prepared and California organizations are being solicited for contributions for the continuation of the advertising. The movement is one which is worthy of the utmost support.

**Municipal Ownership is Waning**

A nation-wide survey which has just been completed by the National Electric Light Association has developed some highly interesting facts regarding municipal ownership. Regarding the material secured from the survey as a whole, the impression is that municipal ownership insofar as public utilities are concerned, is on the wane, despite the political agitation which has been prevalent in several states during the past year. Some of the striking facts uncovered by the survey follow:

The majority of municipal plants are in towns of 1,000 population or less, where funds cannot be raised except by pledging public credit.

Municipal plants produce only 4 per cent of the electricity generated in the country, and this percentage is constantly decreasing.

The average rate of all municipal plants is more than twice as high as the average rate of all companies reported by the U. S. census.

In 1912 power was purchased by 8.7 per cent of the municipal plants. In 1917 power was purchased by 23.3 per cent, and there has been a great increase in the number of municipal plants which have shut down their generating plants since 1917.

Many so-called "municipal electric plants" are merely distributing systems, and purchase their power from companies. Estimates based on the McGraw electrical directory show that in 1921 over 26 per cent of all municipal plants purchased power, and the trend during 1922 in that direction has been marked.

Of the population of the United States served with electricity, the companies serve 93.8 per cent and the municipal plants 6.2 per cent.

The average city tax rate in 1921 as shown by the U. S. census in cities over 30,000 having municipal plants doing commercial business was $19.31. The average city tax rate for the non-municipal plant cities nearest in population to the above was $15.50.

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**Funds of Utility Commission Are Threatened**

Mandamus proceedings for the dual purpose of holding the funds of the California State Railroad Commission out of the state general fund and to require the use of such funds for commission purposes only will be introduced into the courts immediately after the close of the fiscal year June 30, 1923, according to Colonel H. G. Mathewson, secretary of the commission. The contemplated action is a friendly one to

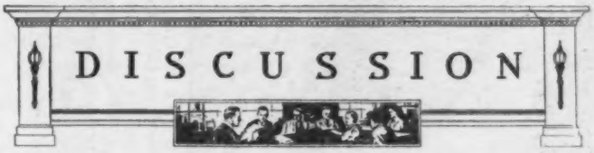
determine by court decision the procedure in the expenditure of the commission's funds under the provisions of the Public Utility Act and the recently enacted budget bill. Approximately $100,000 is involved in the litigation.

"If we must transfer these funds, paid to the commission for valuations, bond issue approvals, inspections and such matters, into the general fund," says Col. Mathewson, "the commission may as well suspend work. All we will be able to do will be to answer correspondence.

"The fees represent the actual cost of the work done plus a small overhead charge. If we must do the work on the money provided in the appropriation bill, and pay the fee into the general fund, we will merely be receiving money from the Treasury in one hand and passing it back with the other. At present the fees create a revolving fund to carry on the work."

Section 85 of the Public Utilities Act is relied upon to hold the fees in a special fund. It provides that money paid into the State Treasury by the commission under the provisions of the section calling for the valuations, assessments and such duties, shall be credited to the "Railroad Commission fund," and appropriates them to carrying out its provisions.

The budget bill provides that in all cases in which statutory provision or appropriations have been made for items of salary or support included in the budget bill the amount fixed in the budget bill shall govern and the other appropriations shall not be deemed in addition. The bill then provides, however, that appropriations for purposes not otherwise provided for in the budget bill shall not be affected by the budget bill.




## Eastern Engineer Is Interested in Cost of Operating California Electric Home

To the Editor:

Sir: As one of the craft I am interested in what your correspondent, Mr. H. L. Garbutt, has to say about the cost of an electric home in California.

An analysis of the cost develops an interesting fact regarding water heating. He maintains a storage system, automatically controlled, the most wasteful way to heat water, according to the gas man's experience.

The most efficient way is to heat water instantaneously, next to that it may be heated intermittently and last of all, as far as economy is concerned, hot water may be held in storage.

The reason why small capacity water heaters have met with favor is that they do not increase the connected load very much, but this may be easily controlled by a double throw switch between the range and water heater or, better than that, an automatic overload circuit breaker may be used (under seal) as is done by the Milwaukee Electric Railway & Light Company on some power services.

In the small town of Morrisville, Vermont, there are about 75 services having combined cooking and water heating installations. The water heaters are 3-kw. capacity. The manager of the plant is responsible for the statement that the average use of electricity by these customers was 200 kw-hr. per month, approximately.

I know of a case where a family of three in a city of 16,000 population has been using a combined cooking and water heating service for seven years, the average use for both purposes being 150 kw-hr. per month. The water heater was 3-kw. capacity and tank not lagged.

What staggers me regarding the cost of operating the California electric home is the cost of water heating. As I understand it, the charge for the month was made up as follows:

| | | | |
|---|---|---|---|
| 30 | kw-hr. @ 8c. | | $2.40 |
| 130 | " @ 3½c. | | 4.55 |
| 141 | " @ 2c. | | 2.82 |
| 301 | " for cooking, lighting and operating two 600-watt air heaters and 7-kw. in air heaters. | | |
| 548 | kw-hr. @ .003 | 1.64 | |
| | Fixer charge | 2.50 | 4.14 |
| 849 | kw-hr. @ 1½c. | | $13.91 per month |

If one could obtain a 1½ cent rate in the East we would all have electric homes.

The point I wish to make is that the amount of electricity used for water heating is all out of proportion to the cooking costs and heating the house.

RALPH J. PATTERSON,
Eastern Sales Manager,
Aetna Electric Appliance Co.

Boston, Mass.
May 22, 1923

## Department on Electrical Construction Arouses Interest of Trade

To the Editor:

Sir: I am enclosing herewith a letter from W. S. Berry which is indicative of the favorable reception which the department on electrical construction is receiving from the trade.

WESTERN ELECTRIC COMPANY, INC.
Supply Department, 680 Folsom Street, San Francisco.

May 23, 1923.

Earl Browne,
c/o Browne-Langlais Elec. Cons. Co.,
213 Minna Street,
San Francisco, California.

Dear Earl:

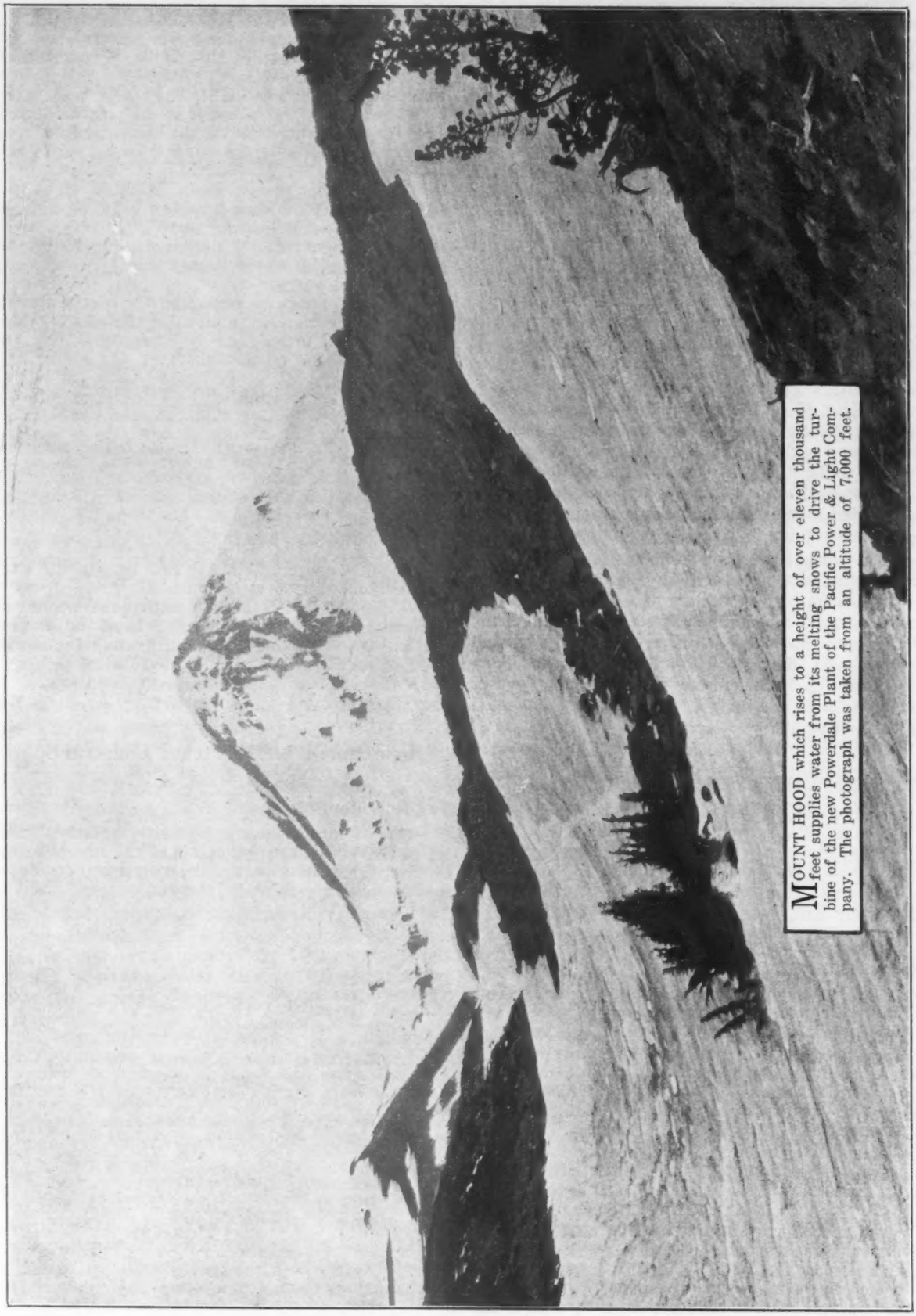
I read with a great deal of interest your article on electrical construction appearing in the Journal of Electricity and Western Industry, issue of May 15, and I also read your first article.

This kind of work is putting over the convenience outlet idea on a big scale and personally I want to thank you for what you are doing along this line. The articles are both interesting and instructive, and the industry is to be congratulated in having an electrical engineer giving so much of his personal time to the promotion of this very interesting subject.

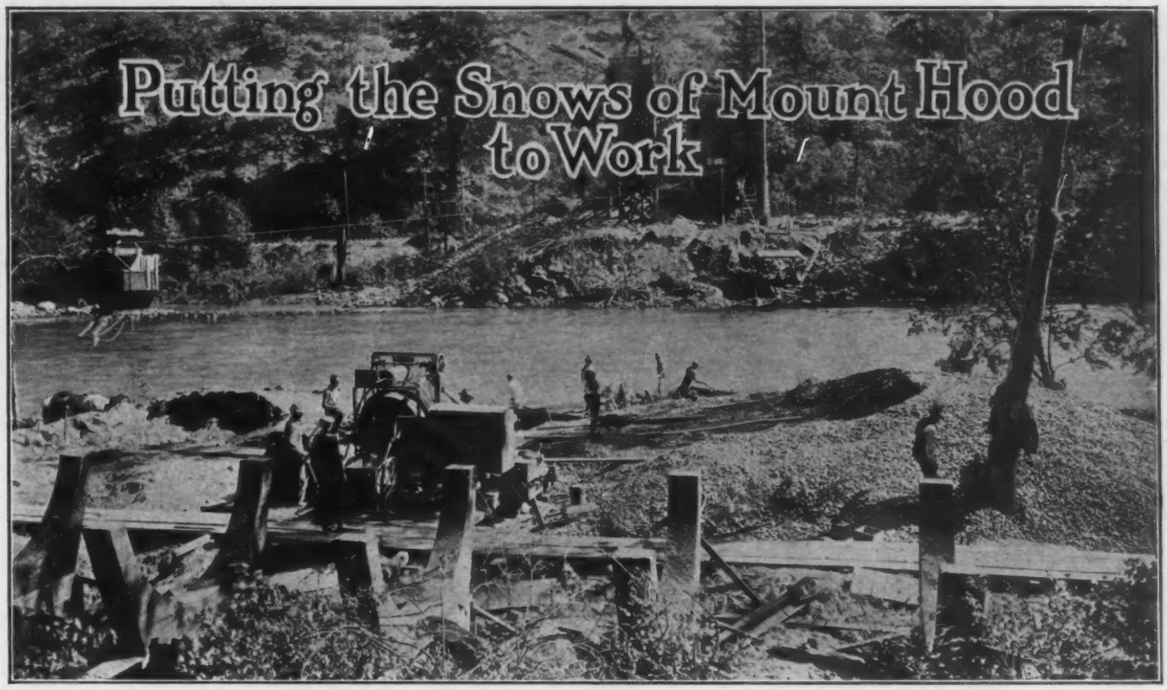
Yours very truly,
(Signed) W. S. BERRY,
Sales Manager.

E. EARL BROWNE.

San Francisco, Calif.
June 1, 1923.



MOUNT HOOD which rises to a height of over eleven thousand feet supplies water from its melting snows to drive the turbine of the new Powerdale Plant of the Pacific Power & Light Company. The photograph was taken from an altitude of 7,000 feet.



# Putting the Snows of Mount Hood to Work

By Lewis A. McArthur
Vice President and General Manager
Pacific Power & Light Company

*THE Powerdale plant of the Pacific Power & Light Company is the newest hydroelectric plant in the Pacific Northwest. Water from the glaciers of Mount Hood is utilized to develop approximately nine thousand horsepower of electrical energy. This plant was delivering energy in less than a year from the time that construction was actually started.*

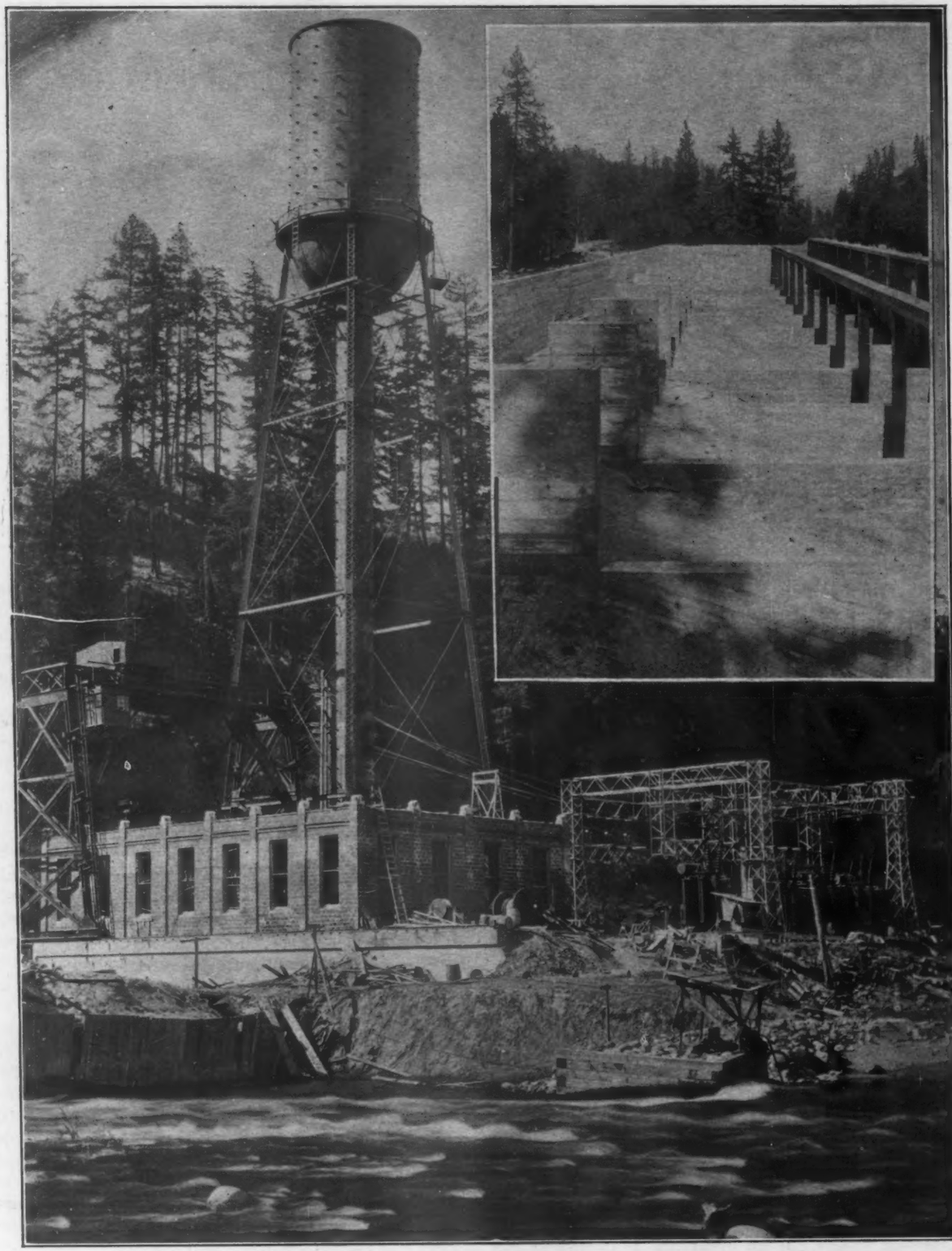
THE Powerdale development of the Pacific Power & Light Company on Hood River is of importance in that its installation marks the resumption of new power plant construction in Oregon after several years of inactivity due to conditions arising from the war. It is believed that from now on there will be considerable new hydroelectric and steam power plant construction in the state.

The Powerdale plant is also important in that it contains the largest single hydroelectric unit in Oregon, and the entire development is equipped with the most modern and up-to-date auxiliaries.

Water is diverted from Hood River about three and one-half miles above its mouth and about three miles due south of the city of Hood River. The dam is of concrete and consists principally of three piers with the necessary wing walls and abutments. Between these piers are two horizontal steel roller gates electrically operated. The main gate is 75 ft. long and 6 ft. 3 in. in diameter, and the short gate on the west side is 25 ft. long and 7 ft. 8 in. in diameter. The tops of the piers are connected by a steel foot bridge and an operating house is built on the middle pier. In this house is located the control for the roller gates. Immediately over the intake gate is a second operating house for the intake control. Between the power house and the intake and dam is a communicating lead of nineteen wires for the operation of company telephones, for the transmission of water gage instrument readings and for the remote control of the gates. The dam is equipped with an approved type of fish ladder.

After leaving the intake the water traverses a concrete lined canal 520 ft. long. The capacity of the development is 500 sec.-ft. of water. The water then enters a settling basin 142 ft. long by 48 ft. wide, this settling basin being built immediately adjacent to and on the west bank of the Hood River. The Hood River has as its main source of supply glacial water coming from Mt. Hood and during certain seasons of the year this water carries large quantities of silt. The settling basin has been installed for the purpose of eliminating this abrasive material. The basin is built of reinforced concrete and the water is skimmed off along the east side into a spillway which is directly connected to 977 ft. of open wood flume supported on trestles. This open wood flume is transposed into 10-ft. diameter wood stave pipe at a transition house. There is very little loss in head between the dam and this transition house which is more than one-quarter of a mile away. Between the transition house and the power house the flow line contains the following different types of construction:

7,851 ft. 10-ft. diameter wood stave pipe
604 ft. 10-ft. diameter steel pipe.
1,409 ft. 8-ft. 4-in. diameter steel pipe
120 ft. 8-ft. diameter wood stave pipe
4,506 ft. 8-ft. 4-in. diameter wood stave pipe.



The new Powerdale plant of the Pacific Power & Light Company on the banks of the Hood River in Oregon. The differential surge tank may be seen behind the power house. The top of the tank is 207 ft. above the base of the turbine which operates under a head of 187 ft. In the insert is shown the specially designed sand trap which is located at the intake of the pipe line. Water to be used in the turbine is skimmed from the top.

The total flow line is 15,985 ft. long. The steel pipe has been placed in positions where there are possibilities of rocks and slides coming down from the side hills above. The short stretch of 8-ft. wood pipe is installed on a steel bridge which takes the flow line from the west bank to the east bank of the stream. During the construction period this steel bridge, which is 120 ft. long, was washed out by a flood and taken several hundred yards downstream without being damaged. It was taken off a gravel bar and put back in place without serious consequences.

The pipe line is supported by 1,360 reinforced concrete saddles. A number of the saddles and a considerable amount of the excavation on this development were completed in 1913 when the Pacific company first planned construction of the plant.

### Differential Surge Tank Used

A short distance before the power plant is reached the pipe line goes under the tracks of the railroad through a steel section, and just before it enters the power plant it is connected by means of a tee to a Johnson differential surge tank with a total height of 207 ft. The size of the tank, which is held above the standpipe on four steel legs, is 28 ft. in diameter and 57 ft. high. The standpipe is 7 ft. 9 in. in diameter and the overflow pipe discharge is 3 ft. in diameter. The surge tank is immediately adjacent to the power house.

An interesting feature of the surge tank and standpipe is the presence of a series of angle-iron lugs arranged around the pipe so that if necessary lagging can be put on to prevent freezing during the winter time.

The power house building is of hollow tile, concrete plastered, and is 47 ft. x 82 ft. and is 17 ft. high. The top is covered by two hatches which may be removed so that the apparatus may be lifted out for repair purposes. In the opposite end of the building from the generator room is a large repair pit into which the apparatus may be dropped by the crane, which travels on outside tracks, is electrically operated, and has a total capacity of 40 tons.

The water wheel is an I. P. Morris unit with a rated capacity of 8,700 hp. It is designed to operate at 360 r.p.m. under a net effective head of 187 ft. It is on a vertical shaft direct connected to a 7,500-kva. Westinghouse Electric & Manufacturing Company 3-phase, 60-cycle generator delivering power at 7,200 volts.

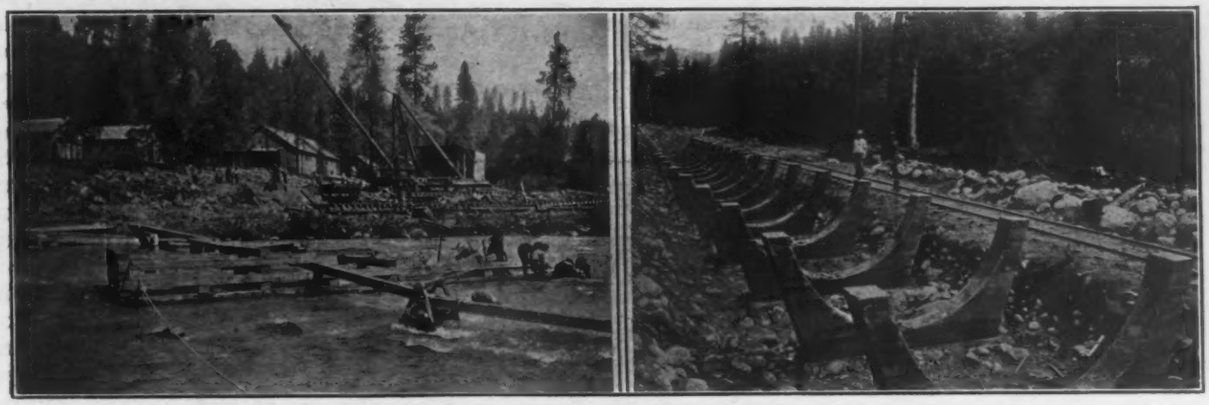
The switchboard is located in a room immediately adjacent to the generating room and consists of twelve panels carrying switch controls and instruments, including the necessary water gage instruments and control for the intake three miles away. All switches carrying high voltage are in fireproof compartments and are remote controlled from the switchboard. One interesting feature of the switching system is a supplementary auxiliary switch which may be substituted, by means of a duplicate bus, for any oil switch in the installation without interruption to service. This makes it possible to substitute the reserve switch for a switch that may have become damaged, and the damaged switch may be repaired without affecting the operation of the plant in any way. The switchboard was built by the General Electric Company. There are also remote control switches for the two banks of 66,000-volt switches in the switchyard. These were built by the Westinghouse Electric & Manufacturing Company.

### New Water Control Units Installed

Before reaching the surge tank the pipe line enters a Venturi meter so that an exact record may be kept of the amount of water used by the plant. Between the surge tank and the power house is the Johnson valve hydraulically operated, and the water wheel itself is equipped with a concrete Moody spreading type draft tube for effective water discharge. This is the only plant in Oregon that is known to have the Moody draft tube, the Johnson control valve and differential surge tank and steel roller gates.

Immediately west of the plant is a steel frame switchboard containing four 2,000-kva. radiator type transformers built by the Westinghouse Electric & Manufacturing Company. These transformers are equipped with oil conservators and are used to step up the energy from the Powerdale plant to The Dalles-Hood River power system.

Construction work on the project was started on June 1, 1922, and the plant was put in operation on May 10, 1923.



Excavating and building the coffer dam preparatory to constructing the diversion dam on Hood River. In the picture to the right may be seen a number of the concrete saddles on which the pipe line is laid.

# Radio and the Electrical Dealer

By David Sarnoff

THE manufacture and distribution of radio apparatus has become a national industry. Radio broadcasting stations are located so that entertainment is heard in practically every part of the United States. Probably more than a million and a half broadcast receivers are in use today in this country. I know of no other industry which has grown so rapidly in so short a time. In fact, the past year has seen radio pass through more progressive stages than the average new product will go through in a decade, and the electrical jobber and the dealer have played an important part in furthering the popularity of the radio set.

DAVID SARNOFF

Vice-President and General Manager of the Radio Corporation of America, who discusses the future of the electrical dealer in aggressively merchandising radio appliances.

The apparatus for radio broadcast reception had its birth in the electrical industry, and it was, therefore, natural that the electrical jobber and the electrical dealer should become the channels of distribution. That the electrical jobbers and dealers have handled millions of dollars' worth of this merchandise in the past year and a half is a matter of considerable credit to the electrical industry. The electrical dealer has now established himself in the radio field, and those with vision and merchandising ability have the opportunity to remain as the leading radio dealers in their communities.

In the early part of 1922, selling radio devices was largely a problem of satisfying the consumer demand. There was at that time little call for real merchandising effort. There followed a somewhat dull summer period; but this was the natural reaction to a period of inflated demand and was more than compensated for by the substantial volume of business effected during the last fall and winter and during the spring of the present year.

### Future Prospects for Radio

We may look with confidence to a good year in radio for 1923 and the years to come. The sustained interest in radio and the public recognition of broadcasting as a useful and educational as well as entertaining service justifies this view. Dealers now purchase their radio supplies in a more business-like and substantial way and there is comparatively little pyramiding of orders, such as was experienced early in 1922. Dealers are also more cautious about the quality of the apparatus they select for sale to the general public. The fact that there has been no hysterical activity this year, and the demand steadily strong, is a healthy indication that the radio business is rapidly becoming a stabilized industry. As the broadcasting stations have constantly improved the quality of their entertainment; as the public is becoming more interested in receiving this entertainment; and as the development of dry battery tubes has made possible the easy transportation of radio equipment to the summer home, to the camp, in the automobile or in the boat, it is reasonable to expect that business this coming summer will hold good and that it will be followed by an autumn of very marked activity.

### Active Merchandising Needed

But selling conditions in radio have changed. The radio dealer has now to engage in aggressive selling methods. The dealers who are building the most successful radio businesses are those who (1) carry the best equipment, (2) give the best service and (3) go out to get business. Many dealers throughout the country have already anticipated these requirements. They have established service shops where damaged sets are repaired; they have a crew of salesmen who put sets into the home on trial and they have construction men whose business it is to erect aerials and make installations. Such dealers are establishing themselves in the radio business on a firm foundation and they will reap a large reward as time goes on.

The radio business has been very helpful to the electrical dealer. In many cases it has doubled or trebled his income, but he can not reasonably hope or expect to derive the full advantages which this new business offers unless he puts sales effort into its development. The keynote of healthy sales is serv-

ice, but service without sales effort will not develop a prosperous business. The electrical dealers have sold radio at a good profit to themselves, but they will do still better when active and aggressive selling methods are employed.

In the case of other electrical devices, dealers have been called upon to develop a demand. Radio is probably the only commodity ever offered to them for which a public demand was created almost overnight. The job now is to maintain and increase the public demand. Dealers must at this period study market conditions and not slow-down their efforts in any respect. There is a nation-wide demand for radio in the home which can only be satisfied by intelligent merchandising methods energetically prosecuted along constructive lines. There is no reason why the electrical dealers should not be able to do everything in a merchandising way that any other dealer can do.

### Women Are the Best Prospects

In the phonograph business, I am told that eighty per cent of all sales of phonograph instruments are made to women, and radio being in the nature of a musical instrument, will have to be sold to the woman of the home. In order to attract the woman to the store of the electrical or radio dealer, it is necessary to provide the little accessories that appeal to and attract her. A show-case full of parts or shelves filled with various types of apparatus mean little or nothing to her. Radio devices are becoming more and more decorative, and they must match the rest of the furniture, if she is to be pleased with their appearance. A great majority of men and women are interested in two important functions, namely, appearance and simplicity of operation. Women particularly are not interested in the technicalities of radio reception and the various types of circuits which many technical salesmen in back of the dealer's counter have been accustomed to employ as a part of their sales talk. I do not think that the electrical dealers as yet fully appreciate the sales value of having:—

1. Their store arranged in such a way as to attract the woman of the home.
2. The type of salesman who understands that the woman is to be sold on the basis of appearance, simplicity of operation, and price.

In a certain western city, there is a radio store which approximates very closely what I expect will be the ultimate retail radio store of the better class. This store, located in the center of the retail shopping district, uses the two large display windows on either side of the entrance to the utmost advantage. The display in one of these windows depicts a home scene showing radio being used in the living room. The other window is used to display various types of sets, and this window is re-decorated daily. Entering upon the wide front doors, you see a large marble room, decorated in gold, with rugs scattered about the marble floor. In the back of this beautiful show room are large booths, in each of which is a complete radio receiving sets and one or two comfortable chairs. Here the various types of sets are operated for the benefit of the prospective customer. Around this show room are tables upon which complete receiving sets are displayed. There are no shelves stocked with boxes, nor are any parts exhibited or sold in this display room. Almost any time you care to go into this store, you will find a number of ladies inspecting and inquiring about various makes of sets, or in the booths, listening to their operation.

Upstairs, over this show room, with a separate entrance from the outside of the building, leading to a stairway, is a completely separate branch of this retail store. In this upstairs room, work-benches are arranged about the walls, in front of which there hang from racks, tools such as pliers, screw drivers, soldering irons, etc. At one end of this room, and partitioned off from it by wire netting, is a stock room well filled with a large assortment of parts.

In this work-room the amateur is welcomed. He can use the work-bench and tools for a nominal sum of about ten cents an hour, and can purchase such panels, parts and cabinets as he requires from the Parts Department, at the end of this room. An efficient radio man is always in attendance, and if any of the amateurs become confused or need suggestions in their work, they are at liberty to call upon this expert who will give them such assistance as they require. These amateurs are kept away from the display room downstairs, because no parts may be had in that section of the building, and no salesman in the display room knows enough about circuits to talk to even the least experienced amateur. The salesmen in the display room are strictly salesmen. The extent of their knowledge of radio is the proper finish and appearance of the set and how each model should be tuned to get results.

### Installing on Ten Days' Trial

In this very modern retail store, there is maintained a crew of three outside salesmen, whose work it is to go out and make arrangements for the installation of the radio receiving set in the home, on trial. Their work is followed up by the service man who makes the complete installation, takes a receipt for the set, explains to the prospective customer how it is operated, and leaves it in the home for this prospect's use. The set is left in the home for a period of ten days, during which time the dealer learns by telephone calls, whether or not the set is operating satisfactorily. At the end of that time, the salesman calls upon the prospect and either collects the money, which he does nine times out of ten, or advises his house to send a man to call and pick up the set. If the customer is unable to pay all of the money in cash, the dealer will accept a third down and the balance in thirty, sixty or ninety days, with a slight additional charge for the time payments, plus interest on the notes. This additional charge, plus the interest, carries a large portion of the overhead for this dealer.

The public is turning definitely to the purchase of complete radio sets which carry the name of well known manufacturers and which are, therefore, known to have behind them manufacturing and research facilities which spell performance and quality.

The electrical dealer must expect to have a considerable amount of healthy competition in the selling of radio, just as he has in the selling of vacuum cleaners, washing machines and other similar merchandise. Department stores and music houses will undoubtedly enter the field of radio to an increasing extent as the new and more recent developments in the art are placed on the market. In the past the active electrical dealer found no difficulty in competing successfully with department stores who were handling similar lines of merchandise. Such competition serves to create a very healthy business for that particular class of merchandise, and will be a means of increasing the electrical dealer's sales both in complete sets and accessories, as soon as he has prepared to take advantage of the opportunity.

In recent years, electrical dealers have seen the advantage of demonstrating electrical appliances, such as washing machines and vacuum cleaners, in the home. By such sales methods progressive dealers have greatly increased the volume of their business, for it has been demonstrated that many do not appreciate the good influence that radio will bring to the home until they have had an actual home demonstration. Others are doubtful as to their ability to operate a radio set, believing that it is extremely complicated. Only an opportunity to use a good set will convince such people.

**Consistent Activity Will Produce Results**

Radio is settling down to a permanent business with ever-increasing opportunities. In a word, it is being stabilized. Energetic and consistent sales activity will produce the outstanding radio dealer of the future. The constant application of vision, initiative and service will in the long run bring permanent results.

In summary, there are three requisites which, if followed, will assure the dealer of a substantial place in the industry:—

(1) Carry the best line of apparatus.

(2) Give the best service, and

(3) Go out after the business by carrying radio into the home.

Let us keep before us the potentialities of the industry in which we are now engaged. The radio set should not be considered merely as an electrical device. It is in fact the greatest educational force that has ever been placed at the disposal of mankind; for through it the voice of the world's leaders in progressive thought is brought directly to the fireside. The best in music, literature and in the arts and sciences becomes available to listeners everywhere. This makes broadcasting a beneficial, vital and living force.

# Recent Safety Rule Developments

By R. R. COWLES*

THE activities of the Safety Rules Committee of the Pacific Coast Electrical Association for the past year have been confined chiefly to the consideration of the Electrical Safety Orders of the Industrial Accident Commission of the State of California. The committee has cooperated with the Safety Rules Committee of the National Electric Light Association in studying the National Electric Safety Code and the National Electric Code as well as the changes proposed thereto. This committee has not concerned itself directly with the rules for overhead line construction as incorporated in General Order 64 of the Railroad Commission of the State of California as this particular subject was assigned to the Overhead Systems Committee. Any recommendations which the Safety Rules Committee has made regarding these rules have been handled through the Overhead Committee.

Meetings of the Safety Rules Committee were held in San Francisco on Nov. 24, 1922, and in Fresno at the engineering conclave on March 22, 1923. It was represented at the national meetings of the Safety Rules Committee in Milwaukee, Sept. 17 and 18, 1922, and in New York on Jan. 29, 1923.

At the meeting of the Safety Rules Committee in San Francisco on Nov. 24, 1922, a committee was appointed to study and make recommendations on matters relating to "Services and Metering Installations." This committee has made the following recommendations:—

1—That grounding of transformer secondaries as covered under General Order 64 of the Railroad Commission be permitted at other points than at the transformer pole and also that primary and secondary grounds should not be permitted on the same pole.

2—That the fuse be omitted in the grounded wire of 3-wire and 2-wire branch blocks.

3—That the space allotment of meters as incorporated in the proposed revised form of the Electrical Safety Orders be changed in accordance with certain dimensions submitted by this committee.

The first recommendation was submitted to the Overhead Systems Committee for its consideration while the second and third recommendations were adopted by the Industrial Accident Commission's general committee.

The chairman of this committee has acted as a clearing house for suggestions regarding the Safety Orders of the Industrial Accident Commission and in this capacity has kept closely in touch with the meetings of the committee which has been preparing these orders.

Your committee believes that a brief resume of the history and present status of the various local

* Safety Rules Committee: R. R. Cowles (chairman), E. R. Banks, J. M. Buswell, R. H. Cates, P. O. Crawford, W. R. Frampton, C. F. Gilcrest, C. A. Heinze, Lloyd Henley, N. B. Hinson, W. F. Jordan, H. G. Keesling, L. M. Klauber, J. A. Koontz, F. B. Lewis, S. J. Lisberger, E. R. Northmore, E. Y. Porter, G. H. Searle, T W. Snell, W. H. Talbot, P. M. Wentworth, J. W. Wheeler, G. M. Wills, J. E. Woodbridge.

and national Safety Codes might be of value and therefore submits the following:—

In 1913 the California State Legislature passed the Workmen's Compensation Act which, among other things, authorized a commission known as the Industrial Accident Commission to issue certain orders covering the installation of electrical equipment in compliance with standard safety practice. The Commission requested the cooperation of various electrical interests to the end that a committee might be formed to draft the proposed Electrical Utilization Safety Orders. This committee consisted of the following:

S. J. Lisberger (chairman), engineer of electrical distribution, Pacific Gas & Electric Company, representing the National Electric Light Association, San Francisco.
J. M. Barry (vice-chairman), chief, Department of Electricity, City of San Francisco.
John Hood, San Francisco; engineer, General Electric Company, representing the manufacturers of electrical equipment.
(H. C. Stanley, General Electric Company, alternate to Mr. Hood.)
H. C. Reid, California Association of Electrical Contractors and Dealers, San Francisco.
Carl E. Hardy, superintendent Electrical Department, City of Oakland.
Max A. Schmidt, Schmidt Lithograph Company, representing the California Employers' Federation, San Francisco.
F. Emerson Hoar, gas and electrical engineer, State Railroad Commission, San Francisco.
(R. M. Vaughan and P. J. Noerager, State Railroad Commission, alternates to Mr. Hoar.)
George Sorenson, secretary, Local Union No. 537, International Brotherhood of Electrical Workers, San Francisco.
H. M. Hansen, business agent, Local Union No. 404, International Brotherhood of Electrical Workers, San Francisco.
Arthur Elken, Local Union No. 6, International Brotherhood of Electrical Workers, San Francisco.
W. H. Urmy, Local Union No. 6, International Brotherhood of Electrical Workers, San Francisco.
J. Morgenthaler, Pacific District Council, International Brotherhood of Electrical Workers, San Francisco.
R. H. Manahan, city electrician, Los Angeles.
H. Conger Bowers, consulting electrical engineer, Southern California Electrical Contractors and Dealers, Los Angeles.
H. M. Scott, International Brotherhood of Electrical Workers, Los Angeles.
R. L. Eltringham, electrical engineer, Industrial Accident Commission.
John R. Brownell (secretary), superintendent of safety, Industrial Accident Commission.

In 1916 this committee completed its work, and after a public hearing was held, the Electrical Utilization Safety Orders became effective on Jan. 1, 1917.

In a similar manner another committee prepared the Electrical Station Safety Orders which became effective on Dec. 1, 1918. This committee consisted of the following:

J. P. Jollyman (chairman), engineer of electrical construction, Pacific Gas & Electric Company, representing the National Electric Light Association, San Francisco.
J. A. Lighthipe, electrical engineer, Southern California Edison Company, representing the National Electric Light Association, Los Angeles.
J. A. Koontz, electrical engineer, Great Western Power Company, representing the National Electric Light Association, San Francisco.
M. C. McKay, general superintendent, Sierra & San Francisco Power Company, representing the National Electric Light Association, San Francisco.
Walter T. Bivins, chief engineer electrical equipment, United Railroads of San Francisco, representing the California Electric Railway Association, San Francisco.
S. H. Anderson, electrical superintendent, Pacific Electric Railway, representing the California Electric Railway Association, Los Angeles.
R. H. Manahan, city electrician, City of Los Angeles, representing the League of California Municipalities, Los Angeles.
Arthur Kempston, chief, department of electricity, City of San Francisco, representing the League of California Municipalities.
R. T. Joslin, engineering department, representing the Pacific Telephone & Telegraph Company, San Francisco.
J. C. Fricke, representing the Western Union Telegraph Company, San Francisco.
H. C. Shaw, division electrical engineer, representing the Postal Telegraph Cable Company, San Francisco.
John Hood, San Francisco engineer, General Electric Company, representing the manufacturers of electrical equipment, San Francisco.
R. F. Behan, Westinghouse Electric & Mfg. Co., representing the manufacturers of electrical equipment, San Francisco.
J. Morgenthaler, president Pacific District Council No. 1, International Brotherhood of Electrical Workers, San Francisco.
C. A. Elmore, president Cable Splicers Union No. 37, International Brotherhood of Electrical Workers, San Francisco.
Henry Boyen, Linemen's Union and Station Operator's Union No. 151, International Brotherhood of Electrical Workers, San Francisco.
H. Warner, Local Union No. 61, International Brotherhood of Electrical Workers, Los Angeles.
William L. Rhys, representing the International Vice-president of the International Brotherhood of Electrical Workers, San Francisco.
J. F. Pollard, gas and electrical department, State Railroad Commission, San Francisco.
B. D. Dexter, gas and electrical department, State Railroad Commission, San Francisco.
R. L. Eltringham, electrical engineer, Industrial Accident Commission, San Francisco.
John R. Brownell (secretary), superintendent of safety, Industrial Accident Commission.

The General Lighting Safety Orders became effective on Dec. 1, 1919.

After the Electrical Utilization Safety Orders had been in effect for about four years, it became apparent that a revision of these orders was essential. They were difficult to interpret as they lacked the necessary detail and were not sufficiently explanatory to cover cases which were continually arising. Improvements in the art have been rapid and this together with the difficulty of municipal inspectors attempting to enforce two sets of rules (the National Electric Code and the Electrical Utilization Orders) made a revision necessary. It must be borne in mind that the city ordinances covering electrical wiring in this State are based upon the National Electric Code while the Workmen's Compensation Act obligates these same municipalities to enforce the orders of the Industrial Accident Commission; and incidentally all departments of the state government are likewise so obligated. It was therefore apparent that in the revision of these orders, it should be the endeavor to combine the essential features of the National Electric Code with the Orders of the Industrial Accident Commission.

Following the procedure used in the formulation of the 1917 Orders, the Industrial Accident Commission wrote to various interested organizations such as manufacturers, employers of electrical labor, employees, and members of municipal inspection departments, etc., requesting them to appoint representatives on a committee whose duty would be the revision of the Electrical Utilization Orders. The first meeting of this committee was held on Sept. 22, 1919. At this meeting the sub-committees were organized and delegated certain portions of the work. A subcommittee composed of members of the Safety Rules Committee of the Pacific Coast Section of the National Electric Light Association was asked to prepare orders relating to "Services and Metering, High Voltage Services, Transformer Vaults and Class B Substations." These sub-committees prepared the original sections of the Orders and on Oct. 24 a general committee met for the consideration of the preliminary orders and their preparation in final form. This general committee consisted of the following:

S. J. Lisberger (chairman), representing the Pacific Coast Electrical Association, Affiliated with the National Electric Light Association.
R. H. Manahan (vice-chairman), Department of Electricity, Los Angeles, representing the League of California Municipalities.
H. W. Stitt, Department of Electricity, Fresno, representing the League of California Municipalities.
Ralph W. Wiley, Department of Electricity, San Francisco, representing the League of California Municipalities.
Carl E. Hardy, Department of Electricity, Oakland, representing the League of California Municipalities.
Fred B. Lewis, representing the Pacific Coast Electrical Association, Affiliated with the National Electric Light Association.
C. W. Mitchell, representing the Board of Fire Underwriters of the Pacific.
J. C. McCaughern, representing the Board of Fire Underwriters of the Pacific.
C. E. Fleager, representing the Pacific Telephone & Telegraph Company.
E. E. Browne, representing the California State Association of the Electrical Contractors and Dealers.
G. E. Arbogast, representing the California State Association of the Electrical Contractors and Dealers.
Morris M. Bruce, representing the San Francisco Chapter, American Institute of Architects.

W. W. Hanscom, representing the San Francisco Section, American Society of Mechanical Engineers.
R. A. Balzari, representing the Electrical Manufacturers' Safety Association of California.
M. C. Hixson, representing the Electrical Manufacturers' Safety Association of California.
E. M. Schlessinger, representing the Electrical Manufacturers' Safety Association of California.
Samuel P. Russel, representing the Electrical Manufacturers' Safety Association of California.
W. T. Bivins, representing the California Electric Railway Association.
B. C. Hill, representing the California Association of Electrical Inspectors.
B. B. Beckett, representing the San Francisco Section, American Institute of Electrical Engineers.
T. A. Panter, representing the Joint Committee of the Technical Societies of Los Angeles.
Robert L. Eltringham, representing the California Electrical Cooperative Campaign.
G. A. Anderson, representing California Electrical Jobbers.
J. H. Clover, representing the State Building Trades Council, and the California State Federation of Labor.
James McKnight, representing the State Building Trades Council.
George F. Flatley, representing the California State Federation of Labor.
Amos H. Feely, representing the International Brotherhood of Electrical Workers.
Kenneth Howard, representing the International Brotherhood of Electrical Workers.
J. E. McCaffrey, representing the Railroad Commission of the State of California.
T. W. Simpson, representing the Electric Sign Manufacturers.
H. D. Brown, representing the Moving Picture Industry.
H. M. Wolflin, superintendent of safety, Industrial Accident Commission.
G. E. Kimball, electrical engineer, Industrial Accident Commission.
F. A. Short (secretary), electrical inspector, Industrial Accident Commission.

**Alternates**

R. R. Cowles (alternate for S. J. Lisberger).
W. F. Jordan, R. H. Cates (alternates for Fred B. Lewis).
D. D. Smith (alternate for C. W. Mitchell).
C. H. Judson, R. C. Barton (alternates for C. E. Fleager).
J. S. Fairweather (alternate for Morris M. Bruce).
Arthur B. Daly (alternate for J. E. McCaffrey).
P. H. Affolter (alternate for R. A. Balzari).
A. E. Rowe (alternate for M. C. Hixson).
H. F. Yost, L. Siebert (alternates for E. M. Schlessinger).
Carl A. Heinze, M. O. Bolser, O. Wingard (alternates for T. A. Panter).
John W. Carrell, Daniel W. Martin (alternates for J. H. Clover).
Arthur Kempston (alternate for Robert L. Eltringham).

From October 24 to Feb. 6, 1922, the General Committee was engaged almost continuously in the consideration and preparation of the orders. The Editing Committee was then instructed to prepare tentative orders for publication and in June, 1922, 6,000 copies of the Proposed Form of the Electrical Safety Orders were printed and distributed.

These orders cover Electric Utilization and Lighting Safety Orders and are in accord with the Electrical Wiring Rules of the National Electric Code, all pertinent features of the National Electric Code being incorporated. These proposed orders were widely advertised in the various publications and by means of circular letters, and requests were made for criticisms and comments from all interested parties.

On Feb. 19, 1923, the General Committee reconvened for the consideration of criticisms and comments and also to consider the proposed changes in the National Electric Code as initiated by the Electrical Committee of the National Fire Protection Association.

At this meeting the following recommendation of the Safety Rules Committee was read and adopted for inclusion in these Orders:

(a) Safe and convenient means shall be provided so that meters on service exceeding 150 volts to ground may be readily tested without hazard to the tester and without interrupting the service (provided that this shall not apply to single motor installations of less than 5 hp.).

(b) The device required by sub-section (a) of this order shall also be provided for testing meters on installations requiring a service switch of greater than 30 amperes capacity (regardless of voltage to ground) and for testing meters in hospitals or similar institutions (regardless of voltage or ampere capacity) where the interruption of service may constitute a hazard.

(c) This order shall not be construed to apply to private individual dwellings, but shall apply to the master meter in apartment houses, hotels, and similar institutions.

This recommendation was the result of several months' active consideration by the Safety Rules Committees and has the endorsement of the Meter Committee. The necessity for such a provision is primarily the result of the requirements for totally enclosed iron clad electric installations as specified in the Electrical Safety Orders. It was felt that the completely enclosed installation would introduce hazards to power company employees in testing or changing meters, which could only be obviated by such "safety testing devices" as recommended by the committee.

The Meter Committee has been asked to prepare general specifications covering types of "Testing Devices" which will be satisfactory to the utilities concerned. It is intended that these specifications be submitted to the General Committee for approval prior to the public hearing.

As the California Electrical Safety Orders are to be in accord with the National Electric Code any changes in said code must necessarily affect these orders.

The General Committee adjourned on March 17 and will take no further action until the public hearing which will be held in the near future. The Electrical Safety Orders will become effective shortly after this public hearing.

No changes are at this time contemplated in the Electrical Station Safety Orders as published in 1918.

The question of jurisdiction of the Industrial Accident Commission in the enforcement of the Electrical Safety Orders has caused considerable discussion. The Industrial Accident Commission has jurisdiction over "employment and places of employment" with the following exceptions: household domestic employees, state, federal and city employees, also overhead and underground lines owned and operated by public utilities which are under the jurisdiction of the Railroad Commission. The Industrial Accident Commission has jurisdiction over generating stations, and substations owned and operated by public utilities. The Electrical Station Safety Orders apply specifically to public utility generating stations, substations, etc.

Many municipalities in California have written into their ordinances, provisions requiring that all electrical work shall be performed in accordance with the Safety Orders as well as the National Electric Code, and some have specified these as minimum requirements. Certain municipalities require other features which are not included in these orders. Inspection outside of the limits of incorporated cities and in those cities which do not have an electrical inspection department are made by the Electrical Department of the Industrial Accident Commission. This Commission has authority to make inspection inside the limits of incorporated cities.

On Oct. 16, 1922, the Industrial Accident Commission initiated a program for the preparation of Elevator Safety Orders and on Jan. 3 a committee was appointed composed of three members from the American Institute of Electrical Engineers, two from the American Institute of Mechanical Engineers and two from the American Institute of Architects. This committee held a meeting on Feb. 6, 1923.

The National Electric Safety Code has been adopted by the American Engineering Standards Committee with the understanding that a sectional committee would be appointed to revise Part 2 of the Code having in view particularly the necessity for standard railway crossing specifications.

The National Electric Safety Code is now subject to change only by the joint agreement of all the interests concerned and cannot be changed by the Bureau of Standards alone as heretofore.

The American Engineering Standards Committee requested a combination of the Fire and Safety Codes to be effected by the American Institute of Electrical Engineers, National Electric Light Association, National Fire Protection Association and Bureau of Standards. An effort was made to have all the sponsors withdraw but the Bureau of Standards declined, therefore the combined code is still under consideration. A meeting is to be called sometime after October, 1923, with the above object in view.

A meeting of the sectional committee for the revision of the National Electric Safety Code was held in Washington on Nov. 2, 1922, at which were present representatives from the public utilities, public service commissions, casualty insurance companies and other interested organizations. At this meeting an organization was created of which Dr. Lloyd of the Bureau of Standards is chairman, C. W. Hayden of the Railroad Commission of Wisconsin, vice-chairman, and R. C. Dwyer of the Bureau of Standards, secretary. A board of directors of nine members was chosen, one from each important interest affected by the code. The National Electric Light Association is represented by Thomas Sproule, chairman of the Safety Rules Committee of the National Electric Light Association, National Body.

The changes in the 1920 edition of the National Electric Code as proposed by the Electrical Committee of the National Fire Protection Association were acted upon at the public hearing in New York City on March 12, 1923. This association distributed a bulletin in January in which were included certain proposed changes. The Safety Rules Committee of the Pacific Coast Electrical Association, through its chairman, made suggestions regarding some of these proposed changes as well as to some of the existing rules which contained objectionable features. Most of these suggestions received favorable consideration at the public hearing.

A few of the more important changes to the 1920 edition of the National Electric Code which affect public utilities are enumerated below:

1—Rule 8-B formerly prevented the use of motor operating at a potential above 2,500 volts between conductors except in central stations, substations, generator and motor rooms. This rule to which your committee has consistently objected has now been changed to read as follows: "Motors operating at a potential exceeding 2,500 volts **to ground** shall be located in motor rooms except in central stations, substations and generator rooms."

2—Rule 15-m—New section added to read as follows: "Where instruments, meters or relays operate with windings or working parts at a potential of 150 volts or above to ground the cases and other exposed bare metal parts of these devices insulated from the current carrying parts shall be grounded unless isolated by elevation or protected by suitable insulating barriers or guards. The size of the ground connection shall not be less than No. 12 B. & S. gage.

"Where instruments, meters or relays are operated from current or potential transformers, the cases and other exposed bare metal parts which are insulated from the current carrying parts, shall be grounded. The ground connection should not be less than No. 12 B. & S. The secondary circuits of current and potential transformers shall be grounded. The ground connection should be of a size not less than in secondary circuit."

3—Rule 15-d—Amended to read: "and the ground conductor of an interior wiring system shall have but one grounding connection within the building served."

4—Rule 45—New section added: "General installation requirements for transformers should be followed wherever practicable except that by special permission of the inspection department, oil-filled transformers having a total or combined rating of 75 kv. or less may be located in furnace rooms of fire resisting construction, if surrounded by concrete curbs not less than 6 in. high forming a basin of sufficient capacity to retain all of the oil used in all of the transformers surrounded."

5—Rule 47—Amended to read: "Primary wires shall not be brought into buildings except power stations, substations and transformer vaults complying with Rule 45-a.

"Air break disconnects shall be installed between oil switches which are used as service switches and the supply wires."

The following addition to Rule 12 was proposed but rejected by the committee:

"Line wires of less than 5,000 volts between wires shall have an approved weatherproof or rubber insulated covering."

At the New York meeting of the Safety Rules Committee of the National Electric Light Association in Jan. 1923, the chairman was instructed to present a plan to the Technical Executive Committee by which the work of the Safety Rules Committee would be assigned to the other Technical Committees, using the headquarters engineering staff to correlate Code activities. This plan was approved by the Technical Executive Committee at its meeting on Jan. 31 which practically assures the discontinuance of the National Safety Rules Committee.

# Standardized Entrance Switches

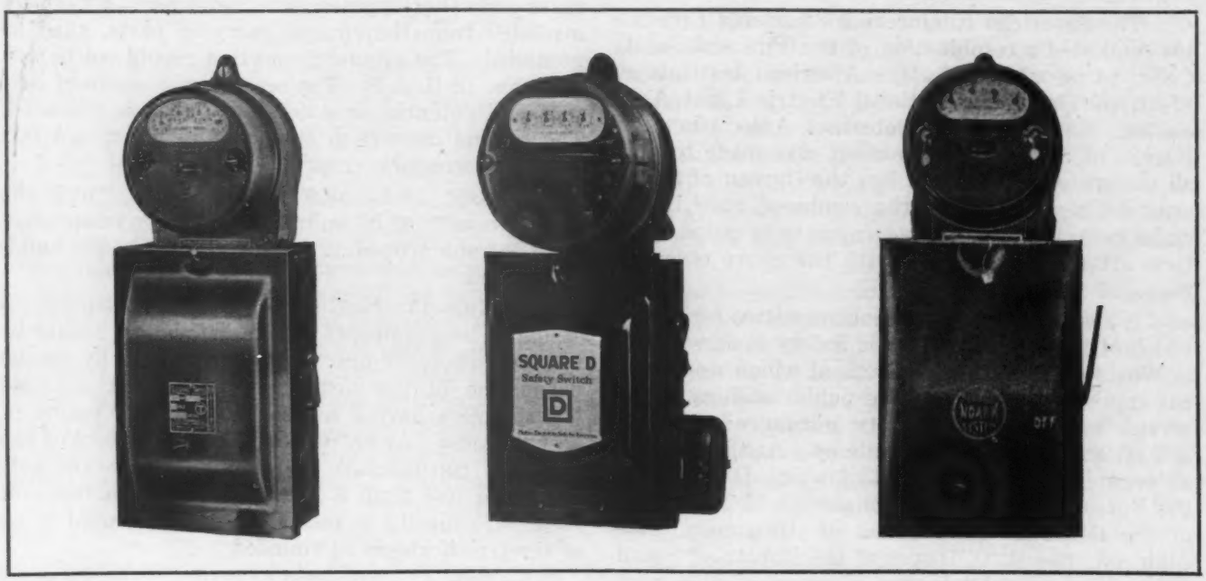
OF late, central stations in the West have been giving considerable thought to the most desirable type of service entrance switches to be used on their lines.

The desirability of having the meter attached to the entrance switch to avoid current theft and tampering has long been established. But to provide a means of successfully effecting this connection involved a great deal of difficulty in the past due to the fact that many different types of meters have been in service, and as many or more different designs of entrance switches. The difficulty of providing the right connection for these many combinations made the task a hard one.

sured of equal protection of its meters, transformers and other equipment. This was possible because the fuses, sealed within the metal switch box, could not be removed and metals of high melting point substituted, as was the more or less common practice. The oft-practiced trick of inserting a coin beneath the fuse plug was stopped.

### A Large Number of Switch Designs

As time went on, more and more switch manufacturers entered the field, each with his individual idea of how a switch should be made. This, of course, introduced a new problem along with the multiplicity of types. Meter trims were not interchangeable. No two switches were alike, and no two



Standardized type of meter service of the Trumbull Electric Manufacturing Company.




Square D standardized entrance switch with meter and cabinet supported fuse block.



Noark standardized service entrance switch manufactured by the Johns-Manville Company.

The open knife entrance switch, of course, has long since been abandoned. The public and the entire industry have given their approval to the enclosed switch. This was at first for safety reasons alone. Then it became apparent that it was possible, at no greater cost, to incorporate within this enclosed switch certain features which would insure against the exposure of unmetered current. It was only necessary to make one end of the box removable and provide an end connection which would fit both the switch and the various meters employed. Thus the "meter trim" came into use.

With it came the practice of sealing the switch box shut. Immediately another great advantage was derived from the practice of sealing the switch box. The main cutout fuses were under seal and serviced by the company supplying the current. The consumer was thus assured of adequate and proper fuse protection at all times, and the power company as-

meters were of the same design. Consequently, no meter trim could be used for any but the one combination.

When a man from the central station went out to install a meter, he had either to take half a dozen different styles of meter trims with him or run the chance of returning for the correct one. He could not tell in advance which of the half dozen or more entrance switches he would find on arriving—and each make of switch demanded a different trim to fit his meter.

There were two alternatives confronting the central stations. They could either create a monopoly for one switch manufacturer by uniting in favor of his switch, or they could permit all makes of enclosed switches to be installed on their lines. The latter alternative would mean that they would have to provide themselves with meter trims to fit all the various switches manufactured. Neither alternative

was desirable; the first for reasons quite apparent; the second because it was impracticable since there was no way of determining in advance which make of switch the central station would find when they sent a man out to install a meter. Then, too, a change of meters would mean endless confusion.

However, there was one way to remedy the situation: to evolve an entrance switch of standard design and dimensions, and allow a number of manufacturers to produce it. It was agreed that this device should incorporate all of the features which experience had shown to be most desirable.

**Standardized Entrance Switch Defined**

Among the features were: first, provision for making either direct load or phantom load tests without interfering with the supply of current to the premises and without the necessity of removing any wires or reconnecting after the test is completed; second, adequate fuse protection for the meter tester while working; third, ample clearance between the sides of the box and current carrying parts; fourth, provision for grounding the neutral wire within the enclosure; fifth, provision for a suitable method of banking switches in multiple installations; sixth, provision for entirely enclosing meter wires within a steel trim. All of these features were met in the device which was evolved and called the Standardized Entrance Switch.

This Standardized Entrance Switch was designed to meet these requirements and to provide uniform dimensions for all entrance switches of the same amperage and number of poles.

Among the standardized types will be found designs which comply with all operating conditions. There are switches which provide for the use of N.E.C. fuses in the 30-amp., 125-volt rating. There are switches which provide for all soldered connections, no binding screws being used. There are switches which provide for the grounded neutral systems and also for those systems which do not carry the neutral grounded. The capacities include as high as 100 amp. in two and three-wire single phase, also polyphase installations in capacities up to 100 amp. Direct current installations are provided for in the same capacities.

The end wall trims for all standardized switches of the same capacity and number of poles are interchangeable among the various makes of switches.

**Further Standardizing Moves**

The latest thought is to provide a standard opening in the end wall into which a shutter is slipped which completes the device as a meter trim. The end wall is supplied by the consumer, the utilities supplying only the shutter. When a meter installation is made, it is not necessary to remove the whole end wall, only a small plate is removed. This leaves an opening in the end wall of a standard size. The meter connection is made through this and a simple, inexpensive shutter, designed to fit that particular meter, replaces the plate which was removed and makes a perfect meter trim. This is a further refinement and one which is another step toward absolute uniformity and simplicity.

A multiple installation of standardized entrance switches showing the use of meters of different sizes and types with the same switch. A separate end wall for each meter was formerly needed but, with the adoption of the new standard opening, only a separate shutter is needed to form a perfect trim between switch and meter.

The standardization idea was gratefully received by the central stations and contractors alike. Many utilities put into effect rulings requiring that all entrance switches served by them be of the standard design. The movement spread most rapidly in the East and Middle West, and now is engaging the favorable attention of western utilities. The benefits to be derived from the adoption of the standardized idea are so manifest both to utilities and contractors as well as the consumer who is assured the maximum protection and service, that it will not be long before it is universally in effect.

# ELECTRICAL CONSTRUCTION

By E. Earl Browne

*AS Mr. Browne points out in this article the man engaged in electrical construction can make additional money for himself, save future expense on the part of the flat owner, and add to the convenieuce of the tenants, by persuading the owner to install adequate outlet facilities at the time the initial wiring is done, even though the same are not immediately used.*

A FLAT is defined as a building of two or more stories containing separate self-contained dwellings, each dwelling having an independent entrance on the level of the street or from an outside vestibule on the level of the first floor. Flats, therefore, in some cities (notably San Francisco), come under the same classification as residences in so far as the electrical work is concerned, and all work, except the service installation, can be done as a knob and bushing system.

Although outlets may not be immediately put to use, it is strongly advisable to install wires in walls and partitions, from the second and third floors to the basement ceiling, at the time the building is being constructed, for future electric air heaters, ranges and water heaters. This can be done at comparatively small cost at this time, but is often difficult and expensive to accomplish after the building is finished. This is shown in the accompanying sketch, Fig. 1. What is most important, if this wiring is installed during the construction of the building, it is not necessary to disturb the tenants when it is desired to extend these circuits to meter board and there install the necessary switches and cut-outs. This point is in my opinion of the utmost importance as the future use of electricity for domestic heating is soon to be as universal as the electric iron and other so-called "socket devices" are today. Since the public has been sold the convenience outlet idea, no home is complete when inconvenient electrically, and even at this time people move into a new home or flat, taking their large air heaters with them, and find that the use of these appliances is impossible without considerable changes to the wiring.

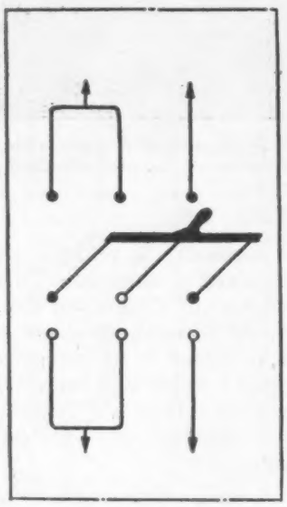


Fig. 5.

In the case of finished buildings where the installation of the electric air heaters, range and water heaters is desired, the cost of wiring for these devices becomes a rather expensive job, particularly in the case of the second and third floors, and in case the building contains hardwood floors. This is due to the fact that the major portion of the work must be done in conduit from the meter board in the basement, along the basement ceiling joists, and up the outside of the building to the location of the various outlets. As good practice dictates that air heaters should be set under the windows in a room, it is logical that the outlets for these should be in the baseboard at that location. In case it is necessary to use exposed conduit on the outside of a building for this purpose, an "LB" Type of exposed fitting with cover and gasket installed on outside of building with a short nipple connecting to a switch box, such as the Gem Type "B," makes a workmanlike job. (See Fig. 2.) If galvanized or sherardized conduit is used it can be readily painted to harmonize with the building.

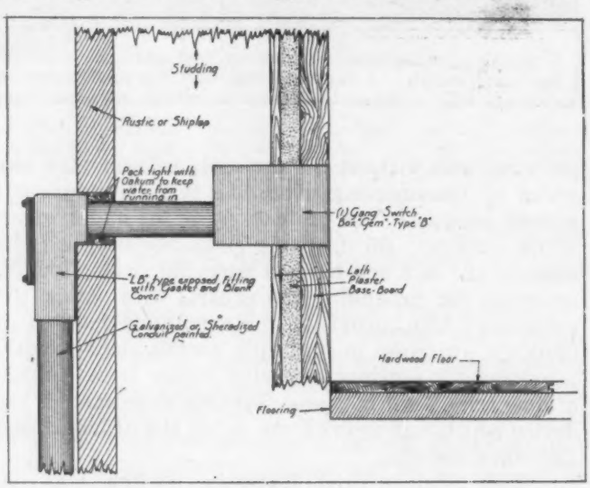



Fig. 2.

In the case of the range and water heater, however, these devices are usually located some distance from an outside wall or light shaft and the best that can be done is to expose as little of the conduit in

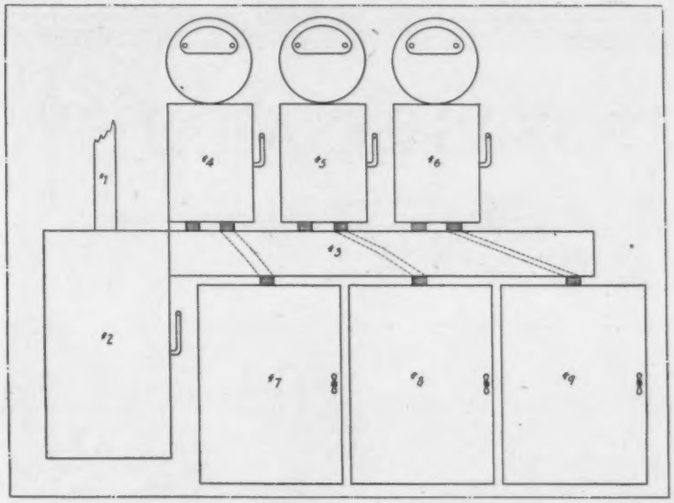


Fig. 4.

No. 1—Service 3—No. 3/0 wires in 2-in. conduit.

No. 2—200-amp., 250-volt, 3-pole externally operated service switch.

No. 3—Metal wireway.

Nos. 4, 5 and 6—60-amp., 250-volt, 3-pole externally operated main distribution switch.

Nos. 7, 8 and 9—Steel cabinets each containing—
1—60-amp., 250-volt, 3-pole switch for range and water heater,
4—30-amp., 250-volt, 2-pole switch for air heaters,
1—30-amp., 125-volt, 2-pole switch for lights.

kitchen as is possible. If there is sufficient space, and the hot water tanks are set in closets next to the flue, it is often possible to use flexible metallic conduit through this space from basement ceiling to the switch on wall.

The alterations to an existing service and meter and distribution board to accommodate the extra equipment are shown in Fig. 3 and Fig. 4 with the following assumed loads:

| | | | | |
|---|---|---|---|---|
| 1 Range | 7 kw. | x 100% D.F. | = | 7.00 kw. |
| 1 " | 7 " | x 66 2/3% D.F. | = | 4.67 " |
| 1 " | 7 " | x 66 2/3% D.F. | = | 4.67 " |
| All air heaters | 30 " | x 60% D.F. | = | 18.00 " |
| All lights | 4 " | x 100% D.F. | = | 4.00 " |
| | | Total, | | 38.34 kw. |
| | 38.34 kw. ÷ 230 volts | | = | 167 amp. |

## Service, Feeders and Sub-Feeders

Due to the extended use of convenience outlet circuits, the question as to where the dividing line should be, with regard to the size of wire in the

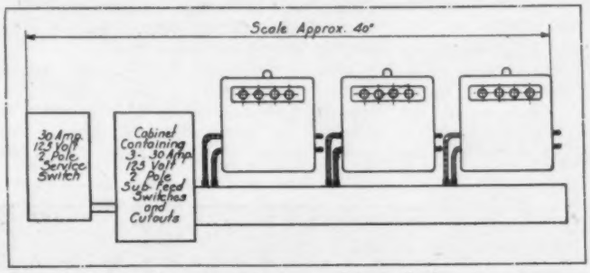

Scale Approx. 40"
30 Amp. 125 Volt 2 Pole Service Switch
Cabinet Containing 3-30 Amp. 125 Volt 2 Pole Sub Feed Switches and Cutouts

Fig. 3.—Alterations to this type of installation to accommodate extra equipment are shown in Fig. 4.

installation of a 2 or 3-wire, 230-115-volt service,[1] feeder[2] or sub-feeder,[3] has been one on which, until recently, no distinct understanding has existed between the contractor, the inspection department and the power company. As a consequence, a contractor has in good faith installed, for example, three No. 12 R.C. wires for a 4-kw. load and the power company would set a 2-wire meter using two of the No. 12 wires for one side of the 115-volt service and one of the No. 12 wires for the other. (See Fig. 5.) This meant that it was possible with the full connected load in operation to subject the one No. 12 wire to almost 35 amp., whereas the code rating of this size is but 25 amp. On the other hand, a 30-amp. switch was installed, thus limiting the fuse protection to 30 amp., which did not permit the occupant to use all of his translating devices.

In order to clear this situation in that city, the San Francisco Department of Electricity has ruled that any occupancy requiring over 35 amp., based on 115 volts, must have a 3-wire service, feeder or sub-feeder. For example, we will assume that a flat has

| | | |
|---|---|---|
| 1 convenience circuit | ..... | 1600 watts |
| 1 " " | ..... | 660 " |
| 3 lighting " | ..... | 1980 " |
| | Total, | 4240 " |

Dividing the 4,240 watts by 115 volts, we obtain 37 amp., which would require a 3-wire sub-feed.

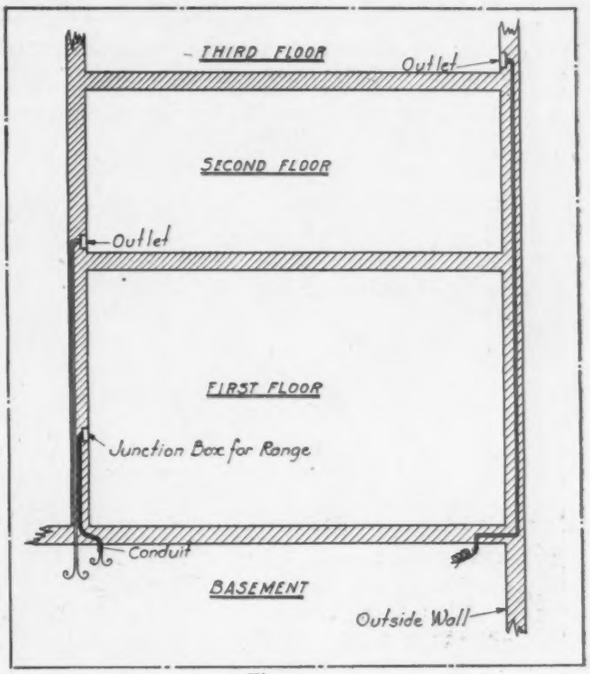


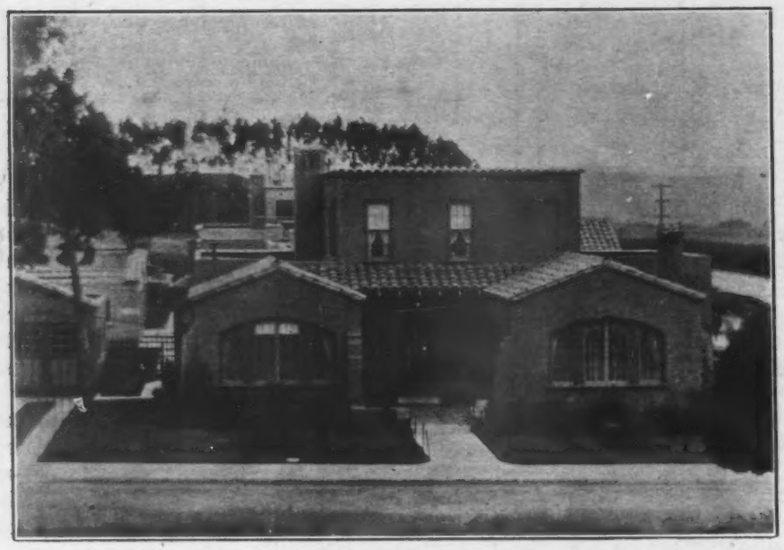

Fig. 1.

[1]A "service" is the conductor by which a supply of electrical energy is carried from the point of connection to the main or sub-mains of the supply system to the service switch.

[2]A "feeder" is the conductor between the service switch and one or more main distribution centers.

[3]A "sub-feeder" is the conductor between a main distribution center and one or more sub-distribution centers.

# JOBBER, DEALER AND SALES AGENT



The second San Francisco Electric Home, erected at a cost of approximately $22,500 and sold within two weeks after the close of the exhibition.

## Second San Francisco Electric Home Is Displayed

### Exhibition Sets New Low Record of Cost to the Electrical Industry—Visited by 15,500 People

California is believed to have achieved a record in the exhibition of an electric home at the least cost to the industry in displaying the recent home in San Francisco. The only cost borne by the industry was the time of the field representative of the California Electrical Cooperative Campaign who prepared the wiring plans and supervised the installation, and the time of the campaign representative who acted as hostess.

The home, views of which accompany this article, was built by Leonard & Holt, sub-dividers, in a new tract at Ingleside Terraces. Its cost was approximately $22,500 and it was sold within two weeks after the exhibition closed. S. Heiman of San Francisco was the architect.

During the two weeks from May 3 to 20 a total of 15,000 visitors was conducted through the home. While it was hoped that this number would reach approximately 25,000, the small number can be explained by the fact that the home is located in one of the most outlying building additions and that the electrical industry did not take the fullest advantage of the opportunity offered for advertising the exhibition.

The home was a Spanish type stucco bungalow consisting of eight rooms and a large basement and laundry. Electrically, it was complete in every detail, the installation including the maximum number of convenience outlets. With the exception of the Adobe Home in Los Angeles, it was the largest and most pretentious of any so far displayed in this state.

The firms cooperating with the electrical industry in displaying the home were Sherman, Clay & Company, piano and music dealers, Lachman Bros., furniture dealers, Curtis Studio, oriental rugs, Durant-Steves Motors, Inc., automobile dealers, and MacRorie-McLaren Company, landscape gardeners. The cost of advertising and publicity was largely borne by these firms.

Several thousand four-page pamphlets explaining the home and inviting the public to visit it, were distributed by the firms who took part in the exhibition and through the electrical industry.

A view of one corner of the kitchen showing the range and some of the appliances.

The dining room, showing the complete electrical equipment and the breakfast nook in the background.

Second prize in the Laun-Dry-Ette window display contest was awarded to the Weiss Laun-Dry-Ette Shop of Spokane, Wash., on this window. Local tie-in was secured by mentioning Washington wool.

# Installing the Display in the Shallow Show Window

## Spokane Dealer Wins Second Prize in Contest with Window Only Two Feet Deep by Using False Footing for Washer

To the dealer who has a display window of small depth, the record of the Weiss Laun-Dry-Ette Shop, of Spokane, Wash., will serve as a guide. In this case the owner of the establishment secured a location for his store on one of the best streets of the city, and in so doing he had to be satisfied with only a small space. The store itself is located on a corner and is quite small.

In selecting a location Louis Weiss, the manager and proprietor of the store, took cognizance of the general trend of traffic in Spokane. It was his desire to secure a location which would be passed by prospective customers and yet would not be on the main shopping street of the city. His purpose was to secure the best possible location and yet stay away from the high-rent district of the main shopping thoroughfare.

The site which was selected is in the Clemmer Theater Building. This building is one of the most modern in the city and has several small, well-kept shops in the store rooms facing the two streets upon which it is built. The Weiss Laun-Dry-Ette Shop has the corner location in the building and is adjacent to the entrance to the theater. In addition to this, the dealer's store is just across the street from the Davenport Hotel, which is a natural meeting place for people of Spokane. Many small shops of good character are located in the Davenport Building, thus adding to the attractiveness of the location selected by the Weiss shop. The street upon which the store is located is one block above the leading department stores.

To obtain the fullest return from this location the dealer found that he should keep his windows well trimmed so that crowds attending the theater might be attracted to his display. The size of the shop prevented Mr. Weiss from adding any depth to his display window, and he found it necessary to use false stage work to support the third leg of any washing machine he cared to use in trimming the windows. The greatest depth which could be obtained in the display window itself was 2 ft.

In addition to the fact that the extremely shallow window prevents the use of it as a suitable base for any large display, it precludes the use of any lights except overhead direct fixtures. As the store is adjacent to the theater, provisions must be made for lighting the display for the evening. Powerful lamps, concealed behind a screen of opaque material, are used to illuminate the displays.

The policy of the shop has been to present displays, featuring the washing machine, electric ironer and cleaner that it retails. Changes are made frequently in order that greater attention may be attracted to the displays.

Although Mr. Weiss has just recently purchased the Laun-Dry-Ette Shop, he entered the window display contest that was conducted by the manufacturer of the washing machine which the company handles. During the contest the shop had four different window displays which were photographed and entered in the contest. In these windows the washing machcine was the central figure and various other properties were used to increase the appeal of the window.

The photographs which were sent to the manufacturer won for the Spokane dealer second prize in the contest. The picture of the prize winning window is reproduced herewith as well as one of the other windows submitted in the affair.

A strong local appeal was put into the prize window by the two exhibits of raw material and finished product which can be successfully laundered in the machine. The Port Angeles sheep farm, spoken of in the hand lettered cards, is in the western part of Washington. Display cards furnished by the manufacturing company supplied information concerning the washing machine.

In another window prepared during the contest no effort was made to get any local appeal. The washing machine itself was used as the motive for the display and was accompanied by an electric ironer and the two display cards used in the prize window.

To permit the window trimmer to place the washing machine in the window it was necessary to construct a false footing for the third leg of the machine. This was attached behind the floor of the window and added a sufficient footing to stand the machine in the background of the display.

A false footing had to be provided to support the third leg of the washing machine because of the shallowness of the window. Direct overhead lighting was used to illuminate this contest display.

# Proving the Utility of the Modern Electric Range

## Manufacturer Cooperates with Pueblo, Colo., Dealers, Newspaper and Foodstuff Merchants to Present Cooking School

"The proof of the pudding is in the eating." According to the Edison Electric Appliance Company, Inc., the proof of the electric range is in its cooking and baking. Because the company believes this, it is carrying on its campaign of presenting cooking schools to the women of the western cities. During last fall cooking schools were conducted in the Pacific Northwest, and since that time arrangements have been made for similar schools in other parts of the West.

The last school that was conducted was presented in Pueblo, Colo. There, in a city of approximately 42,000 people, a cooking school which was open five days, had a total attendance of about 1,300 women. According to the reports of those in charge of the school, after the first day from twenty to fifty women were turned away from the doors at every lecture.

In the Colorado city it was deemed advisable to conduct the series of educational lectures under the auspices of the Pueblo Star-Journal, the local daily newspaper. The cooking school was named the Star-Journal Cooking School and the paper gave whole-hearted support to the entire campaign. J. H. Fiester, of the Edison Electric Appliance Company, Inc., with headquarters in Salt Lake City, Utah, made the preliminary arrangements for the school. He took an active part with the newspaper men in securing of advertising space from the local dealers and in obtaining the cooperation of the foodstuff dealers in Pueblo.

In preparing for the school a vacant store building in the downtown district of Pueblo was secured and the electric range to be used in the demonstration was placed on a platform and connected to the power company's lines. A kitchen cabinet and a refrigerator, each supplied by local furniture dealers, were located on the platform so that the demonstrator could have her supplies handy. Seats for 225 women were placed in the store. To attract attention to the school two electric ranges were displayed in the show windows. The range to be given as the first prize in the bread-baking contest, the washing machine, that was to go to the winner of the cake-baking contest, and the vacuum cleaner, the first prize in the pastry division, were displayed in one window. Cards explaining the three articles and the basis for awarding them accompanied the devices. In the other window of the store appeared the second range and the various minor prizes. These consisted of foodstuffs and the like that had been donated by the cooperating merchants of Pueblo.

Advertising for the school started on the Sunday before the scheduled opening. This gave two full days for preliminary announcements before the first lecture was given, as the opening was held on Tuesday. Advertisements consisted of double-page spreads, this space being used from Sunday until the following Friday. In addition to this a large front page news item, concerning the record attendance and interest displayed by the women, appeared in the Star-Journal every day. These news stories helped considerably to keep the cooking school before the public eye.

According to A. R. Wooley, of the Salt Lake office of the Edison company, attendance at the meetings was surprising. The room, with its seating capacity of 225 women, was overcrowded at every lecture except the first one. Many women were turned away daily and Mr. Wooley estimated that each day about forty women stood and lined the walls of the room during the entire lecture. The talk that was presented by Miss B. E. Galvin, of the home economics department of the Los Angeles office, Edison Electric Appliance Company, Inc., lasted about two and a half hours. Interest among the housewives was keen at all times.

In conducting the demonstrations Miss Galvin followed rather a set schedule. As the women entered the room they were given envelopes containing booklets on electric ranges and kindred appliances, a memorandum card with a program pencil attached and a question card. The question card was one which gave the women an opportunity to list any question which they might have. These question cards were deposited in a box as the women left and were turned over to Miss Galvin so that she might answer the questions on the following day. The cards were headed with: "Miss Galvin, I want to know:" The cards also provided space for the women to write their names and addresses. The guests were also advised to place their names on these cards even though they had no questions to ask, as it was stated that a better record on attendance could be kept.

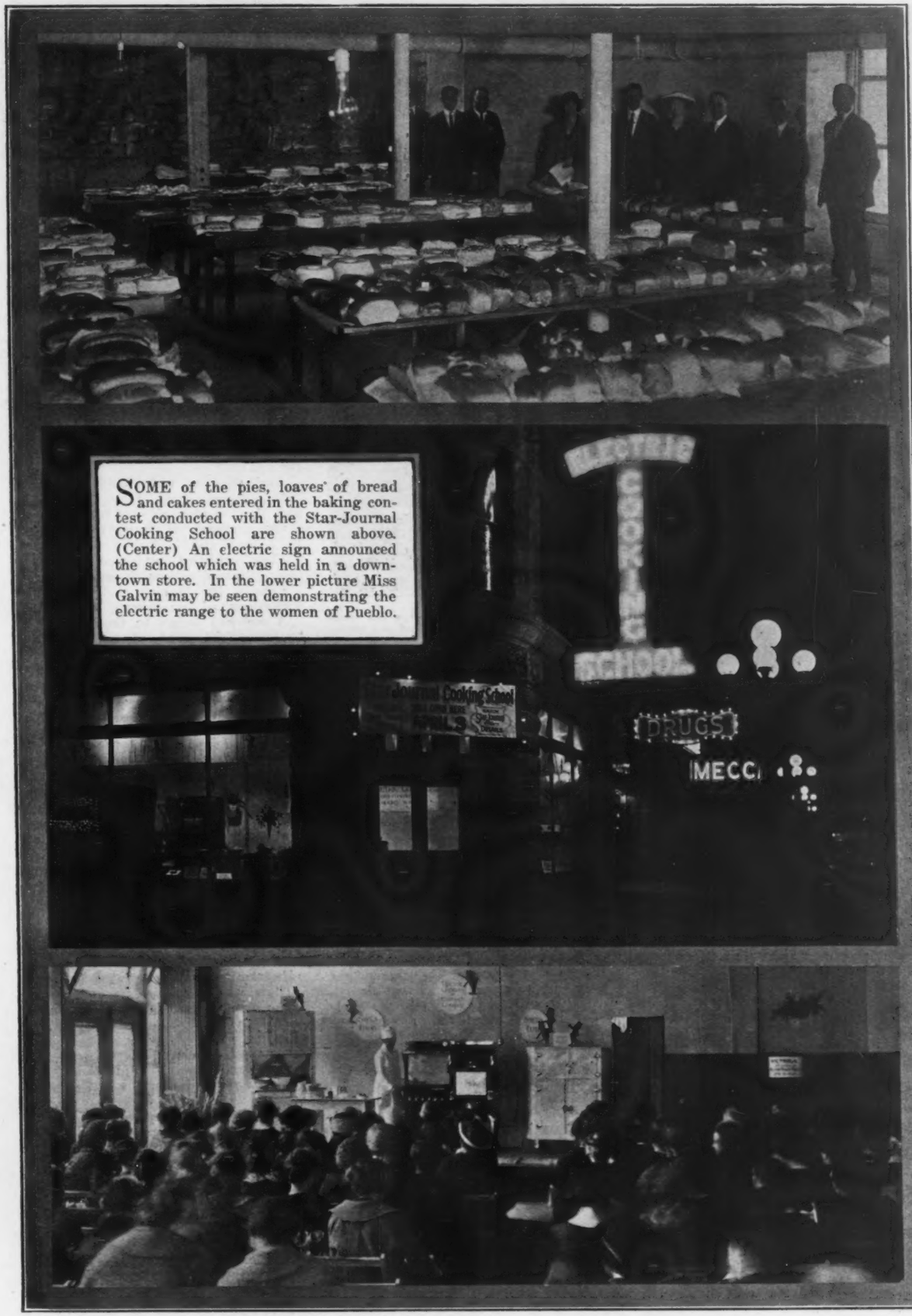
Through these cards the names of about 700 prospects were secured and one woman wrote on the card, "Please come to our house and sell us an electric range." After the lectures the local range dealers canvassed all of the homes from which question cards had been received.

One of the principal features of the educational campaign was the baking contest, entries for which were received on Saturday, the last day of the school. Three divisions were made in this contest and six prizes were given in each division. All of the articles entered in the contest were later given to orphanages in Pueblo. Interest in the contest was very keen, as can be told from the number of entries. One hundred and sixty-five loaves of bread were entered along with 135 cakes and 96 pies. The range, washing machine and vacuum cleaner shown in the display window of the store were the first prizes in the three divisions.

The results obtained through the cooking school were particularly pleasing to the manufacturer and the electrical dealers in the city. A great deal of interest in electric ranges was aroused and a number of sales were closed immediately. In the two weeks' period following the school thirty ranges of the make used in the demonstration were sold and a number of sales were nearly completed in the same time. It is Mr. Wooley's opinion that about 60 per cent of the names secured through the question box will have to be disregarded as prospects for ranges this year, but he believes that a great many of them will be developed.

The range campaign in Pueblo was conducted primarily for the Southern Colorado Power Company. This company was represented by E. F. Stone, superintendent of light and power sales. Bert Rowley, of the Edison Electric Appliance Company, Inc., with offices in Salt Lake, was one of the leaders in arranging the school.

All of the foodstuffs displayed in this window were given as prizes in the baking contests conducted by the Star-Journal Cooking School, recently held in Pueblo, Colo. The electric range and washing machine awarded as first prizes may be seen in the background to the right.




SOME of the pies, loaves of bread and cakes entered in the baking contest conducted with the Star-Journal Cooking School are shown above. (Center) An electric sign announced the school which was held in a downtown store. In the lower picture Miss Galvin may be seen demonstrating the electric range to the women of Pueblo.

The polar bear being kept cool by the fans suggested to the Denver resident that a fan would cool him also if one were installed in his home. The white floor covering intensified the appeal.

# Suggestions Used to Sell Electric Fans in Denver

## Window Display of Denver Gas & Electric Light Company Shows Polar Bear Being Kept Cool by New Model Fans

To the small boy going to the Chautauqua where he is to hear a brass band play grand opera music, the only pleasure to be derived from the concert, as far as he is concerned, is that obtained while endeavoring to torment the musicians. In preparing for the entertainment, the average boy secures a small stock of lemons and is then ready to occupy one of the front seats in the tent. The results of these preparations are known by everyone. The musicians playing wind instruments, on seeing the small boy suck the lemon, find to their embarrassment that their mouths have begun to water and that their instruments have become filled with saliva. The suggestive powers of the lemon are too great for many musicians and in a number of cases, the small boy finds, to his delight, that the players are forced to stop.

In this prank of the small boy may be found a message for the electrical dealer. He, too, can use the power of suggestion to gain his purpose, but greater thought must be given to the subject than the small boy gives to his trick. In the case of the merchandiser suggestion must be used to convey a thought which will react to the benefit of the person to whom it is applied.

The Denver Gas & Electric Light Company, in cooperation with the Westinghouse Electric & Manufacturing Company, recently installed a window display which had a sales promotion idea backed by suggestion alone. The window display was designed to stimulate the sale of electric fans and the purpose of the exhibit presented was to suggest, by means of electric fans and the figure of a polar bear, a way to keep cool during the warm weather.

In preparing the display, a picture of which is reproduced on this page, Mr. Littlefield of the Denver Gas & Electric Light Company and Mr. Barrett of the Westinghouse company in Denver, determined to design a window which would present the appearance of a cool spot in the center of the hot sidewalks and streets of Denver. They knew that by showing an animal which was always associated with cold climates, the feeling of coolness would be suggested to anyone seeing the display. Naturally, the passer-by would look for the thing which kept the polar bear cold and on seeing the electric fans, would realize that they would also keep him cool during the hot days.

The bear which was used as the center of the display is 9 ft. 3 in. high, weighed 1,990 lb. when alive and is reputed to be the biggest bear ever killed in Alaska. The Dupler Fur Company, Denver manufacturing furriers, loaned the model to the window trimmers. An electric fan was placed in his paws and six white fans were directed at the animal to "keep him cool."

The idea used by the Denver central station and the manufacturer has proved to be one worthy of mention. Excellent results have been obtained.

## A BEHEADING BEE FEATURING "THE OTHER BIDDERS WERE"

By JOE OSIER

Not long since a number of contractor-dealers in a city located much less than a thousand miles from Nowhere—

Were invited to attend a beheading bee staged by a Capitalist and a w. k. architect who were trying to—

Build a $500,000 office building for about $250,000.

While the invitation to attend the fracas did not state baldly that the guests were expected to furnish the entertainment, this was implied because—

Each man, whose bid had been opened, tabulated and studied, was asked to shave this item, shade that figure and—

Slash his entire estimate to the marrow. In other words, they were told, individually, that—

If they wanted the contract they would have to take it for the privilege of—

Renewing acquaintance with the working class and wearing out their old clothes.

And so, the Low Bidder and the "other bidders were" came to the party and they conferred—and they smoked cheap torches and drank some alleged B. V. stuff and—

They whittled and deducted from their original estimates and—

Finally, the biggest Goof in the lot walked out of the private office with—

A one-way ticket to the bankruptcy court in the coat of his three-way "unie."

I know the instance I have just cited is nothing new. The same little game is being played wherever buildings are being built and—

The moaning of the sad sucker who slashed is heard to High Heaven and—

Still the little game progresses without police interference and—

Men of the Trade continue inheriting the dizzy heights, the tail-spin and the unprofitable and sickening flop.

And all this occurs in spite of the work of Associations where members are taught to figure costs of doing business, which, necessarily, must include overhead and a fair margin of profit.

And so, today, I arise on my haunches to state that until men engaged in the electrical industry learn that the way to attain material success is not by—

Undermining, knifing, strangling—

There will be no success and—

The owner who challenges bidders to mortal combat, using pencils as weapons, will—

Always be declared the winner.

Conferences may be all O. K.—depending upon the size of the bottle, but—

If I were in the game and were called into conference, I would say:

"There is my figure. It is consistent with good business practices and principles and I'll abide by it. If you can use me and my high-class organization, fine. If not, I'll see you later, but—

"Not at the cleaners."

Now I feel that is the way the game should be played and I'm willing to wager there are thousands of men in the business who feel likewise—therefore—

That being the case, I'm going to pick up the marbles because—I Win.

Special truck purchased by the California Electrical Cooperative Campaign for transporting portable window display about state. F. N. Smith, southern California field representative of the Campaign is shown on the left, while Robert L. Eltringham, the executive manager, is on the right.

# Portable Window Display Is Arousing Interest

## California Electrical Cooperative Campaign Provides Special Truck for Transporting Exhibit About State

For immediate effects in stimulating the business of central stations and contractor-dealers, the portable window lighting exhibit of the California Electrical Cooperative Campaign, described on page 186 of the March 1, 1923, issue of the Journal of Electricity and Western Industry, has no parallel. To date the exhibit has had eight showings before a total of 2,000 merchants and the amount of business which has been derived is estimated at several thousands of dollars.

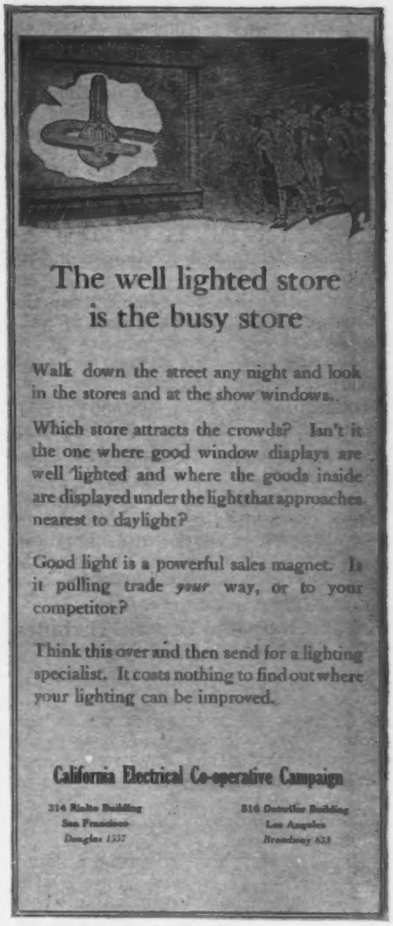
In addition the display has aroused national attention. Requests for details as to its construction and method of operation have been received from the Pacific Northwest and from cooperative organizations and large central stations in several eastern cities.

Recently the California Electrical Cooperative Campaign has had built a special truck for transporting the exhibit from city to city. A photograph of the truck appears above. The body of the truck is 6 ft. 3 in. wide and 12 ft. long and has been designed to carry the entire equipment comprising the exhibit. The truck has been painted to attract the major amount of attention in the cities which it visits. The body is a bright yellow and the running gear red. The lettering on the side and back is silver shaded with red and blue. The campaign insignia is green, blue and red.

As described in a preceding issue, the exhibit itself is constructed after the fashion of stage scenery and can be assembled or dismantled in the minimum amount of time. The lighting equipment is most complete and includes a complete trim of the highest quality, to be used in those cities or towns where the proper merchandise would not be available. It is the usual practice to cooperate with a local merchant, securing from him the material to be displayed in the window at the time of the lecture on proper illumination. In the smaller localities, however, such merchandise is not always obtainable. Consequently material for a complete window trim has been incorporated in the exhibit. This includes draperies, rugs, a screen and several articles of furniture. While in some of the larger cities where the exhibit has been shown a merchant has often displayed merchandise valued at $3,000 in the window, practically the same effect has been secured with an outlay of less than one-tenth that amount.

The field representative who accompanies the exhibit to the various localities is a regular "jack-of-all-trades," being a chauffeur, stage hand, electrician, lecturer, illuminating engineer and salesman. In the larger cities the lecture is given by an illuminating engineer furnished by one of the manufacturers, but in the smaller places a representative of the Cooperative Campaign does the speaking.

The exhibit has been displayed in the following cities: San Francisco, Oakland, Los Angeles (twice), Whittier, Riverside, Pomona and Pasadena. In Oakland and Los Angeles special programs were prepared under the auspices of the electric clubs, to which the merchants were invited as guests. In other localities the exhibit is displayed before some one of the various merchants' association. It has been found that so general is the interest displayed by the merchants that once the exhibit is shown in one locality the merchants in adjacent cities will often make requests that the same show be staged for them.


The well lighted store
is the busy store
Walk down the street any night and look in the stores and at the show windows.
Which store attracts the crowds? Isn't it the one where good window displays are well lighted and where the goods inside are displayed under the light that approaches nearest to daylight?
Good light is a powerful sales magnet. Is it pulling trade your way, or to your competitor?
Think this over and then send for a lighting specialist. It costs nothing to find out where your lighting can be improved.
California Electrical Co-operative Campaign
314 Rialto Building
San Francisco
Douglas 1557
816 Detwiler Building
Los Angeles
Broadway 623

A sample of the literature distributed to the merchants at the exhibition of window display.

# INDUSTRIAL NEWS

## Los Angeles $35,000,000 Bond Issue Fails to Pass

Proposition No. 6 authorizing the issuance of $35,000,000 in bonds for the Bureau of Power and Light of the City of Los Angeles, Calif., failed to receive the necessary two-thirds vote in the municipal election June 5. Complete returns from 859 precincts out of a total of 862 showed 41,264 votes for the issue and 38,319 against the measure. While receiving a slight majority the bonds lacked more than 11,000 votes for final approval.

The proposition called for $10,000,000 for improvement and extension of the present municipal distribution lines within the city and $25,000,000 for the generation of power at Boulder Canyon on the Colorado River and the transmission of this power to the city. It is believed that the reference to Colorado River power caused the defeat of the measure as the $10,000,000 appropriation for improvements and extensions was vitally needed. Opponents of the measure pointed out that development of the Colorado River was outside the province of the city and was at least five years in the future.

Five other bond issues on the municipal ballot carried at the election. They were:

Proposition No. 1.—$7,500,000 for purchase of site and erection of a City Hall.

Proposition No. 2.—$500,000 for the purchase of site for extension to public library.

Proposition No. 3.—$15,000,000 Harbor Improvement bonds.

Proposition No. 4.—$2,000,000 for construction of viaducts and flood control.

Proposition No. 5.—$1,500,000 Playground bonds.

Proposition No. 7.—To allow the Los Ageles Electric Railway to build a subway terminal underneath Pershing Square in the heart of the business district received a large majority.

## Power Company Orders Turbines for Mystic Lake Plant

Contract for furnishing two 7,500-hp. impulse turbines for the Mystic Lake plant, has been awarded to the Pelton Water Wheel Company of San Francisco by the Montana Power Company. The new power house is to be built in the gorge of the Rosebud River, in the Beartooth Mountains, 43 miles from Columbus, Mont.

The turbines which have been ordered are of the single runner, single nozzle type and are to operate under an effective head of 1,050 ft. They will be equipped with auxiliary relief nozzles and direct motion governors. The contract includes two hydraulic cylinder operated valve gates to be installed at the power house and a butterfly valve to be placed at the head of the penstock. The butterfly valve will be equipped for electric motor and hand operation and will embody direct and remote control features.

Preliminary work on the pipe line grade and penstock line was started some time ago and the company plans to have this work completed by August. Work on the power house itself will not begin until this preliminary work is completed.

Last fall the road which had to be built by the company to enable it to transport materials to the dam was completed to a spot within three-quarters of a mile of the dam site. Work has been progressing on this road during this spring. It is reported that a railroad will be constructed along the pipe line grade to provide service for hauling dam materials.

The Mystic Lake plant when completed will stand the company an investment of about $1,000,000 and will enable it to serve the southern part of the state more efficiently. It is planned to have the first unit completed by the fall of 1924.

## League of Southwest Discusses Colorado River Projects

Plans for the development of the Colorado River were among the subjects discussed at a conference held by the League of the Southwest at Santa Barbara, Calif., June 7-9. The principal speakers on this topic were Robert Sibley, publicist and engineer of San Francisco; W. G. Clark, consulting engineer of New York City, and George H. Maxwell, of Phoenix, Ariz., executive director of the National Reclamation Association.

Mr. Sibley, after interviewing practically all of the leaders in the states interested in the development of the river, presented a paper covering the problems of developing the river. Mr. Clark, representing a group of Philadelphia capitalists, outlined plans for a proposed power development at Boulder Canyon. The plans propose the development of about a million horsepower. The project would require a dam 1,000 ft. high.

Mr. Maxwell's paper covered a preliminary study of a high line canal serving Arizona and southern California. The project would provide irrigation for a part of the Imperial Valley in California and a portion of Arizona. It would also be possible to develop approximately a million horsepower under this proposal.

## Federal Power Commission Halts Action on Applications

The Federal Power Commission has recently announced that action on several applications has been suspended until certain surveys have been completed. Among these are the application of the Rocky Mountain Power Company for a permit for a project on Flathead River below the outlet of Flathead Lake in Montana. This involves development of 270,000 hp. The Commission desires to await the report of a commission that is investigating the Columbia Basin Project. The Commission consists of Assistant Secretary of the Interior Goodwin and R. P. Davis, director of the Reclamation Service. The applications of the Utah Power & Light Company and that of James B. Girand for projects on the Colorado River were also placed on the table to await action on the Colorado River compact.

The Commission has officially granted to the Mount Shasta Power Corporation, a subsidiary of the Pacific Gas & Electric Company a license for 50 years for Pit No. 3, and one for 2½ years for Pit No. 4. A preliminary permit has been granted to the Murtaugh Irrigation District for a period of 3 years for a project on Snake River and Rock Creek, located on public lands in Twin Falls and Jerome Counties, Idaho. The district plans the development of approximately 13,740 hp.

Announcement has been made by the Commission of the receipt of three applications for power projects in the western states. The Construction Company of America is seeking a preliminary permit to construct a dam in the Mokelumne River, in Amador and Calaveras Counties, California, with a tunnel 1½ miles in length, leading to a power house in the basin of Dry Creek. A second dam will be built in Dry Creek, creating a large reservoir which will serve to restore the flood waters of the Mokelumne River for irrigation use. C. W. Thuringer has made application for a preliminary permit to develop four small projects in the vicinity of Ward, Boulder County, Colorado. About 3,000 hp. will be developed on South St. Vrain Creek and Left Hand Creek.

The City of Denver, Colo., has made application for a preliminary permit for a proposed project in the North Fork of the South Platte River, in Jefferson County, about 20 miles west of Denver. The project will consist of a pipe line about six miles long leading to a power house. This project will constitute one unit of an extensive program which the city has under consideration.

## National Superpower Survey Is Subject of New Book

Of recent years two important superpower surveys have been made of various sections of the United States, one in the Boston-Washington district and the other in the Pacific Northwest. A much larger survey, nation-wide in its scope, has just been completed by Frank G. Baum, San Francisco consulting engineer. In his "Atlas of the U. S. A. Electric Power Industry" (McGraw-Hill Book Company, Inc.), Mr. Baum has divided the country into twelve regional districts all of which would be connected by 220,000-volt lines to obtain the greatest possible benefits from diversity, service, insurance, etc.

The purpose of the book as explained by the writer in the introduction was the collection of facts of the power resources and the power demands of the United States, in order to have a basis for analyzing the situation and determining what is the best solution for the power problems of the country. Mr. Baum calls attention to the various economies which might be effected from such a superpower system, not only in the "banking" of the power facilities but also in the equalization of the power resources, resulting in a distribution of population and industries not otherwise possible. He points out the savings which might have been effected if the railroads could have followed a definite plan of construction from the beginning and urges the power industry to adopt some such plan before the time is too late.

Every phase of such a plan is entered into by Mr. Baum in his book. He discusses power markets and makes his recommendations upon sound observations. The charts and plates are intensely interesting and contain information of great value.

Mr. Baum's book is a very valuable and far-sighted contribution to the art and economics of electric power transmission and will well repay close study and application.

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**The San Francisco Association for the Blind,** is endeavoring to raise $97,000 for the purpose of purchasing the building in which the association has a factory, and a small lot adjacent to the building. If the money is raised the organization will build a warehouse on the small lot and will continue the manufacture of reed furniture, brushes, etc., in the building which it now occupies. This organization employs about 50 blind persons at present and if the addition is made will be able to use a larger number of employees. The reason for purchasing the site is that the owner of the building refuses to lease the building at the old rental and the new charge is said to be excessive.

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CHARLES A. COFFIN MEDAL
FOR DISTINGUISHED CONTRIBUTION TO THE DEVELOPMENT OF ELECTRIC LIGHT AND POWER FOR THE CONVENIENCE OF THE PUBLIC AND THE BENEFIT OF THE INDUSTRY
AWARDED TO

Reproduction of the Coffin Medal awarded to the Southern California Edison Company.

## Southern California Edison Co. Awarded Coffin Medal

The Southern California Edison Company, Los Angeles, was presented on June 7 with the gold medal of the Charles A. Coffin Foundation, offered for the first time last year, to the electric public utility company of the United States which made the most notable contribution during the year to the development of electric light and power service. This is the first award of the medal to be made by the Foundation, which was created by the General Electric Light Company. The recipient was selected from eighteen electric light and power companies which submitted their year's records for consideration, and the decision is understood to have been extremely close.

The presentation of the medal was made during the meeting of the Public Policy Committee of the National Electric Light Association which was holding its annual convention in New York. Frank W. Smith, of New York, president of the association and chairman of the association's Charles A. Coffin prize committee, officially presented the medal, which was accepted by John B. Miller, president of the Southern California Edison Company.

The award of the medal was accompanied by the presentation of a check for $1,000 to be applied to the employees' benefit fund of the Southern California Edison Company, under the terms of the Foundation.

The Charles A. Coffin Foundation was established by the board of directors of the General Electric Company in December, 1922. It constitutes a tribute to Charles A. Coffin, who retired that spring after forty years of association with the electrical industry, this period including the founding by him of the General Electric Company, of which he was the leader for thirty years.

## General Electric Company Plans Broadcasting Station

Faith in the permanence of radio broadcasting is demonstrated by the announcement of the General Electric Company that the first plant to be constructed exclusively for popular broadcasting will be erected in Oakland, Calif. to house the large Pacific Coast station of that Company.

Work will be started this month on a two-story building, the antenna towers and the power house. Workmen are already assembling the radio equipment. It is expected that the new station will be in the air within six months.

Martin P. Rice, director of broadcasting for the General Electric Company, will direct the operating policy of the station and Dr. Thomas Addison, manager of the company's interests on the Pacific Coast for the past thirty years will have supervision of the plant. The station will be located on East 14th Street, Oakland, adjacent to the new General Electric Company factory building.

The plans provide for a two-story brick structure. On the first floor will be the office of the studio manager, a general correspondence room, a reception room for artists and quarters for motor-generator sets and storage batteries. There will be two studios on the second floor, the main studio large enough to accommodate large bodies of musicians such as a band or symphony orchestra, and a smaller studio from which solo numbers and addresses may be broadcasted. The use of two studios will make possible continuous broadcasting. Research is now being carried on to determine the reverberating qualities of the ideal studio in order that the proper amount of dampening may be secured in the Oakland studio to assure maximum musical quality.

One thousand feet back of the studio building will be the power house and antenna system. The antenna will be multiple-tuned and strung between two steel towers built by Pacific Coast Steel Company, each 150 ft. high and placed 260 ft. apart. Beneath the antenna proper will be the counterpoise consisting of a network of wires, 14 ft. above the ground, covering an area of 150 x 300 ft.

The transmitting set will be similar to that which is now used at WGY, Schenectady, N. Y. The developments which have been made in this station will be part of the Pacific Coast station equipment. The apparatus is now being manufactured in the Schenectady works of the General Electric Company and will be tested there.

The Pacific Coast station will be operated at 1000 watts but the equipment will be designed in excess of that power for purposes of conducting tests. In operating high-powered equipment below normal rating in broadcasting, tubes and rectifiers are not subject to occasional overloads and, as a result, superior quality and greater reliability of transmission are obtained.

The Pacific Coast station of the General Electric Company will utilize "remote control" to broadcast church services and musical entertainments from San Francisco and Oakland. The Pacific Telegraph & Telephone Company has offered to provide land wire connection for this type of service.

# Program for San Francisco Convention Announced

## Will Hold Meeting of Seventh Annual Convention of Pacific Coast Electrical Association at Fairmont Hotel

Of outstanding importance on the program of the sixth annual convention of the Pacific Coast Electrical Association to be held at the Hotel Fairmont, San Francisco, June 19-22, 1923, is the Western Development Conference which will be held on Friday, the closing afternoon of the convention. Included among the speakers will be Governor Friend C. Richardson, California, Governor James G. Scrugham, Nevada, Governor Charles Mabey, Utah, Willis Booth, president of the International Chamber of Commerce, A. C. Hardison, president, California State Farm Bureau, Paul Shoup, vice-president, Southern Pacific Railway, and D. M. Botchford, vice-president, Columbia Steel Company.

This conference is expected to be one of the most noteworthy ever sponsored by the association.

The complete program for the convention follows:

**PROGRAM**

**1923**

**Tuesday, June 19**

**Morning**

9:00 a.m. REGISTRATION.
All members are requested to register for themselves and their guests immediately upon arrival.

12:00 Noon. San Francisco Development League will hold its regular weekly luncheon at the Fairmont Hotel, following a special Electric Vehicle program.
All members and guests are invited to attend.

**Afternoon**

BUSINESS SESSIONS OF TECHNICAL AND COMMERCIAL SECTIONS

**Technical Session:**

L. J. Moore, chairman, presiding.
Executive Engineer, San Joaquin Light & Power Corporation.

2:00 p.m.
1. Report of Apparatus Committee.
2. Special Paper by J. E. Woodbridge on Induction Regulators versus Synchronous Condensers for Distribution Circuits.
3. Special Paper by H. Michener on 220-kv. Apparatus.
4. Report of Prime Movers Committee.
5. Report of Power Factor Committee.
6. Special Paper by O. A. Knopp on Kva. Demand Meters.

**Commercial Session:**

Don C. Ray, chairman, presiding.
Manager, Electric Sales Dept., Pacific Gas & Electric Company.

1. Opening, including announcements, and Chairman's Address.
2. "Possibilities in the Electric Vehicle Field—An Opportunity Overlooked by the Electrical Industry," by A. M. Frost.
3. Meeting of Committee Chairmen of Commercial Papers.

**Evening**

8:30 p.m. Showing of Publicity Committee's film on Power Development.

9:30 to 12 M. Dancing (informal), Rainbow Lane.

**Wednesday, June 20**

**Morning**

BUSINESS SESSION

9:30 a.m. General Business Meeting.
Address of Welcome, by Hon. James Rolph, Jr., Mayor of San Francisco.
President's Report.
Address, by Carl D. Jackson, Counsel N.E.L.A., New York City.
General Committee Reports.
General Business Session.
Appointment of Nominating Committee.

**Afternoon**

BUSINESS SESSIONS — TECHNICAL AND COMMERCIAL SECTIONS, 2 p.m. to 5 p.m.

BUSINESS SESSIONS—ACCOUNTING AND PURCHASING & STORES SECTIONS, 2 p.m.

**Technical Session:**

L. J. Moore, chairman, presiding.

2:00 p.m.
1. Report of Hydraulic Power Committee.
2. Special Paper by R. J. C. Wood on Water Hammer.
3. Special Paper by R. A. Monroe on Friction Tests on Penstocks.
4. Report of Meter Committee.
5. Report of Underground Committee.
6. Special Paper by N. B. Hinson on Underground System, S.C.E. Co.
7. Special Paper by M. O. Bolser on 35,000-volt Cable Installed in Los Angeles.

**Commercial Session:**

Don C. Ray, chairman, presiding.

2:00 p.m.
1. "Merchandising Electric Ranges" by Herbert Cram.
2. "Domestic and Commercial Data on Cooking, Water and Air Heating," by J. Wrenn.
3. "Industrial Electric Heating," by E. B. Criddle.

**Accounting Session:**

C. P. Staal, chairman, presiding.

2:00 p.m. General Session.

**Purchasing & Stores Session:**

C. A. Kelley, chairman, presiding.

2:00 p.m. General Session.

**Wednesday, June 20**

ENTERTAINMENT

9:30 a.m. Automobile Trip for all registered lady guests around San Francisco, visiting Twin Peaks, Golden Gate Park, the Cliff House, etc., returning to hotel at 1 p.m. Those desiring to go, please notify Registration Committee not later than Tuesday evening.

3:00 p.m. Shopping Tour of principal Department stores, returning to hotel at 4:30 p.m. Those desiring to attend, please notify Registration Committee not later than Wednesday noon.

8:30 p.m. Dancing (informal) in Rainbow Lane.

**Thursday, June 21**

**Morning**

BUSINESS SESSIONS OF TECHNICAL AND COMMERCIAL SECTIONS.

**Technical Session:**

L. J. Moore, chairman, presiding.

9:00 a.m.
1. Report of Safety Rules Committee.
2. Report of Overhead Systems Committee.
3. Special Paper by H. A. Barre on Line Operation at 220,000 Volts.
4. Special Paper by W. J. Canada, Director of Engineers, N.E.L.A.
5. Report of Inductive Co-ordination Committee.
6. Representative of California Railroad Commission will be present to join in discussion.

**Commercial Section:**

Don C. Ray, chairman, presiding.

9:00 a.m.
1. "Field of Commercial and Residential Lighting," by R. S. Prussia.
   a—"Business Possibilities of Residential Lighting.
   b—"Office Building and Flood Lighting.
   c—"Industrial Illumination.
   d—"Show Window Lighting.
   e—"Lighting of Retail Stores.
   f—"Electric Sign and Billboard Illumination."
2. "Existent Conditions in Modern Communities Make Adequate Street Lighting a Necessity," by H. H. Sandoval.
3. "Domestic Electric Refrigeration," by H. C. Rice.

There will be no afternoon sessions of the Convention on Thursday.

ENTERTAINMENT

9:00 a.m. Automobile Trip of East Bay District for all registered lady guests. Leave San Francisco via Key Route Ferry at 9:40 a.m. Special Key Route train will be provided from the Key Route pier to Claremont Hotel, where automobiles will meet the party, driving through East Bay territory, visiting Skyline Boulevard, University of California, etc. Luncheon will be provided at Claremont Country Club: party to be returned to San Francisco not later than 4:30 p.m.

12:00 Noon. Kiwanis Club luncheon at Hotel Fairmont. All members and guests of the Convention are invited to attend.

**Golf:**

1:00 p.m. Registered delegates and guests are invited to enter the Golf Tournaments to be held on the famous links of the San Francisco Golf and Country Club.

**Tennis:**

2:00 p.m. A Tennis Tournament will be held on the Grace Cathedral courts, corner Sacramento and Taylor Streets, San Francisco. Prizes will be awarded. This tournament is open to men only. All entrants must register with Committeeman R. R. Cowles before Thursday morning. List will be provided at the Registration desk.

**Evening**

8:30 p.m. Grand Ball (formal) with Special Features. Fairmont Hotel Gold Ballroom. (Admission by ticket provided at Registration.)

**Friday, June 22**

**Morning**

GENERAL BUSINESS MEETING

10:00 a.m. Business Session and Conference.
Address by M. H. Aylesworth, Executive Manager, N.E.L.A., New York City.
Transaction of all Unfinished Business.

12:00 Noon. "California Forward" Meeting—California Development Association. All delegates and guests are invited.

**Afternoon**

**Western Development Conference:**

A. Emory Wishon, presiding.
Vice-President and General Manager, San Joaquin Light & Power Corporation.

2:00 p.m. Opening of the Conference by Governor Friend C. Richardson, State of California.

Responses:
Governor James G. Scrugham, State of Nevada.
Governor Charles Mabey, State of Utah.

Address: "The Development of the West as a National Economic Necessity," by Willis Booth, President International Chamber of of Commerce, and Vice-President Guarantee Trust Company, New York City.

Address: "The Agricultural Phase of Western Development," by A. C. Hardison, President California State Farm Bureau.

Address: "Transportation as a Factor in Western Development," by Paul Shoup, Vice-President Southern Pacific Company.

Address: "The Steel Industry as a Basic Industry in the Development of the West," by D. M. Botchford, Vice-President and General Manager of Columbia Steel Company.

**Evening**

6:30 p.m. Banquet—Main Dining Room. John A. Britton, Toastmaster. Vice-President and General Manager, Pacific Gas & Electric Company.
Addresses by men prominent in Industry, Commerce, and Finance.

10:00 p.m. Polyphase Pageant of Progress to be presented in Main Ballroom. (Admission by ticket provided at Registration.)

10:30 p.m. Dancing (informal).

SPORTS AND TRIPS

10:00 a.m. Ladies' Putting Contest in the lobby of the hotel. No handicap. Three prizes to be awarded to those having best scores. All entrants must register at Registration desk with Committeeman Arthur Rowe not later than Thursday noon.

2:30 p.m. Special trip through Chinatown for registered lady guests. Those desiring to make the trip, please assemble at Registration desk.

**Saturday, June 23**

SPECIAL POST-CONVENTION OUTING TRIP

A special trip to Mt. Tamalpais and Muir Woods will be arranged, provided seventy-five (75) persons indicate their desire to make this famous trip. Mt. Tamalpais, situated on the north shore of San Francisco Bay, with Muir Woods at its base, is one of the beauty spots of Northern California.

**Trip No. 1.**—Leaving San Francisco 9:45 a.m. via Northwestern Pacific ferry, arriving summit of Mt. Tamalpais 11:45 a.m. Luncheon at the Tavern. Leave Mt. Tamalpais 1:45 p.m., arriving Muir Woods 2:25 p.m. Leave Woods 4:30 p.m., arriving San Francisco 6:35 p.m. Rate for the entire all-day round trip, including luncheon at Tavern, $4.93.

**Trip No. 2.**—Leaving San Francisco same time as Trip No. 1, and leaving Mt. Tamalpais at 1:46 p.m., returning direct to San Francisco, arriving at 3:35 p.m. Rate for the trip, including luncheon at the Tavern, $3.73.

The California Baking Company has been operating this electric truck equipment in San Francisco with marked success.

# Electric Truck Parade to Be Held in San Francisco

## Street Parade Will Be Opening Event of Annual Convention of Pacific Coast Electrical Association on June 19

Over 75 electric trucks will parade up Market Street in San Francisco at noon on June 19 as the opening event of the annual convention of the Pacific Coast Electrical Association. This parade, which will be headed by Acting Chief of Police Mooney, will have in line electric trucks from the fleets of the large truck users of the city. Included in the firms entering trucks are the following: the Old Homestead Bakery, the California Baking Company, the National Ice Cream Company, the Emmons Draying Company, Pacific States Electric Company, General Electric Company, Pacific Gas & Electric Company.

The parade has been arranged for by the Electric Transportation Association. R. C. Griffin of the Pacific Gas & Electric Company, who has been actively in charge, has arranged to have banners attached to the trucks calling attention to the features of the electric truck, such as savings in transportation costs, long life, dependability and durability.

Following the parade the San Francisco Electrical Development League and the Electric Transportation Association will hold a joint meeting at luncheon at the Fairmont Hotel. This meeting will be attended by the delegates to the convention of the Pacific Coast Electrical Association. The electric truck will be the main topic of the day, as a truck will be on exhibition and the main speaker will address the meeting on this subject. Slides illustrating applications will accompany the talk.

The Electric Transportation Association is cooperating with the San Francisco Development League by joining with that body. An overflow meeting of the Transportation Association and the Development League was held on June 11, at which time members of the former made a very effective plea to all branches of the electrical industry to support and encourage the electric truck development. It was pointed out at that meeting by the speaker for the Association that the electric truck investment in the metropolitan district of New York totals $23,000,000, and that the annual saving to users of electric trucks over other kinds of transportation amounts to $6,900,000. The 4,666 electric trucks in New York City consumed during the past year approximately 27,000,000 kw-hr. with a revenue of over $1,000,000 to the central stations.

The fleet of electric trucks operated by the Old Homestead Bakery. Twenty-four electrically driven trucks are used by this firm in San Francisco.

## Annual Northwest Convention Is to Convene on June 27

The Sixteenth Annual Convention of the Northwest Electric Light & Power Association will be opened at the New Washington Hotel in Seattle, Wash., on June 27. The first session of the four-day meeting will be held at 9:30 a.m. on that day and at that time N. W. Brockett, president of the association, will deliver the President's Annual Address. General sessions of the association will also be held at 2 p.m. and at 8 p.m. on the same day.

Concurrent sessions of the four sections of the association will be held on June 28, the meetings starting at 9:30 a.m. and at 2 p.m. Presiding officers for the sections will be as follows: Public Relations Section, George L. Myers; Commercial Section, Lewis A. Lewis; Accounting Section, George F.

Nevins; Technical Section, R. M. Boykin.

In the evening of the second day a "Splash Party" will be held at the Crystal Pool. Only delegates and guests of the convention will be admitted to the pool and balcony.

Arrangement has been made to transport the delegates to Victoria, B. C., on the morning of June 29. The trip will be made by Canadian Pacific steamer and the association members and their registered guests will leave at 9:30 a.m., arriving at Victoria at 1:30 p.m. During the stay in Victoria the visitors will be entertained in a number of different ways. Automobile trips have been arranged as well as golf tournaments. An informal dinner dance will be given at the Empress Hotel, which is to be the headquarters while in Victoria. The return to Seattle will be started June 30 at 4:30 p.m. and the party will disembark at 9:30 that evening.

All of the meetings of the association will be held at the New Washington Hotel in Seattle, except the executive session which will be conducted at the Empress Hotel on the evening of June 29. Hotel reservations can be made by addressing the Hotel Committee, Northwest Electric Light and Power Association, 406 Electric Building, Seattle, Wash.

## Announcement of Reorganization Made by Majestic Company

Announcement of the purchase of the plant, equipment and good will of the Majestic Electric Development Company by the Majestic Appliance Company, Inc., has recently been made. The latter company will continue the manufacture of Majestic heaters and appliances at the San Francisco factory.

The personnel of the Majestic Electric Appliance Company, Inc., is as follows: A. T. Burch, president; T. M. Simpson, vice-president and general manager; H. H. Daley, sales manager; and E. W. Botts, auditor. According to the announcement the entire Majestic line has been redesigned and has added to the line of air heaters and pancake and waffle irons.

## Canadian Power Company Is Host to Municipal Officials

The manager and staff of the British Columbia Electric Railway Company recently entertained the Vancouver city council and the mayors and reeves of the surrounding municipalities at a dinner given at the Stave Lake Plant of the company. The occasion of the dinner was the visit of Sir Ernest Maes Harvey, one of the London directors of the company. Three dams which will total approximately 1,000 ft. in length and ranging from 50 to 75 ft. high are being erected at the Stave Lake site.

George Kidd, general manager of the power company, informed the guests that present work was giving employment to about 275 men and that the work would be finished in September at a cost of more than $1,000,000. The work is being done to assure maintenance of the present supply of power rather than to increase it. This will be done by storing water to be used during the dry period in the fall and winter.

With regard to the company's future plans, Mr. Kidd said that at present the Stave Lake plant develops 52,000 hp., the Lake Buntzen plant 84,000 hp., and the auxiliary steam plant, Vancouver, 17,000 hp., making a total of 153,000 hp. The company proposes to raise this to 268,000 hp. by erecting a 120-ft. dam in a narrow gorge and by connecting Alouette Lake and Stave Lake by a tunnel, 3,900 ft. in length. This work and the installation of the necessary machinery will cost in the neighborhood of $10,000,000 and it will be done gradually, as the demand for power in the vicinity increases. It may be ten years, or even more, before these plans are consummated.

## Voluntary Rate Reduction Offer Made by Power Company

The Montana Power Company has recently requested the Public Service Commission of Montana to permit it to take a voluntary reduction in rates. The action comes in answer to a citation to show cause why there should not be a substantial reduction in rates.

The new schedules which the power company offers to put into effect for itself and affiliated companies provide a reduction ranging from 2 cents per kilowatt-hour for the first 100 kw-hr. used in private households to 4 cents per kilowatt-hour for all additional power over 150 kw-hr. used for domestic purposes.

The Public Service Commission has announced that it is studying the reductions offered in the filing and if the reductions are accepted the new rates will go into effect July 1. The new domestic rate would be as follows:

First 25 kw-hr., 8 cents.
Next 25 kw-hr., 4 cents.
Next 100 kw-hr., 3 cents.
All additional, 2 cents per kilowatt-hour.

## Officers for New Year Elected by Seattle Engineers

At the regular monthly meeting of the Seattle section of the American Institute of Electrical Engineers, the election of officers for the coming year was held. The meeting was held May 23 in the Telephone Building, Seattle, Wash.

The section elected the following officers: Charles Lund, superintendent of distribution of the Tacoma municipal light department, chairman; Joseph Hellenthal, superintendent of distribution for the Puget Sound Power & Light Company, Seattle, secretary. Mr. Lund succeeds C. F. Terrell, and Mr. Hellenthal succeeds E. S. Code.

During the meeting the engineers were addressed by Clifford E. Mong, transmission engineer of the Pacific Telephone & Telegraph Company. Mr. Mong's talk dealt with a typical installation of a telephone long distance toll cable. Charts, curves and diagrams were used to illustrate the address.

**The Pacific States Electric Company** has recently taken over the exclusive distribution for the Chance line of anchors, manufactured by the Chance Company of Centralia, Mo. This arrangement is the outcome of a recent trip to the Pacific Coast, of A. Bishop Chance, president of the company bearing his name. The Chance line of products will come under the direct supervision of H. R. Noack of the Pacific States Electric Company.

## Colorado Springs Company Loses in Fight for Franchise

By a vote of nearly four to one, the voters of Colorado Springs, Colo., have refused to grant another 25-year franchise to the Colorado Springs Light, Heat & Power Company, at a special election held on June 12. Eight hundred and sixty-six votes were cast in favor of regranting the franchise and the vote against the proposition totaled 2,948.

The present franchise of the company expires Sept. 8. In view of the fact that General Goethals has made a report stating that the city could not develop sufficient hydroelectric power economically it is not known whether a counter proposition will be offered the company by the city or whether a franchise will be granted some other utility company. Municipal ownership is yet possible.

**The index for Volume 50** of the Journal of Electricity and Western Industry has been prepared and is ready for distribution to subscribers. Copies of the index can be secured by addressing the circulation manager of the Journal of Electricity and Western Industry, 531 Rialto Building, San Francisco, Calif.

# Books and Bulletins

### PRESENT DAY PENSTOCK DESIGN

Report of Hydraulic Power Committee, N.E.L.A. Prepared by Hydraulic Committee, Pacific Coast Electrical Association. Paper. 8¼ by 11 in. 80 pages. Illustrated. 55 cents. National Electric Light Association, 29 West 39th St., New York.

Recent advance and improvements in penstock design, especially with reference to high head installations such as are typical of western development, form the principal item of discussion in the report of the Hydraulic Power Committee recently adopted at the annual convention of the National Electric Light Association. The work of compilation has been done in the West by the Hydraulic Power Committee of the Pacific Coast Electrical Association under the direction of H. C. Doolittle, assistant chief engineer of the Southern California Edison Company.

The body of the report covers features of each company's experience in the design and operation of penstocks and constitutes information of great value to other companies considering similar problems. It is a symposium of the latest improvements and advancements in penstock design and construction. Many phases of the subject are covered in an unrelated fashion and the report would be more valuable if it were properly indexed. Manufacturers and trade names are used indiscriminately and no favoritism is shown. The statements of manufacturers are interesting and are in keeping with the spirit of the report which is to bring out the latest developments in the subject.

From the standpoint of past committee reports, this one sets a new high standard. The illustrations and tables are particularly valuable and no space has been wasted on non-essentials. As a reference work on penstock design, the report fills a long-felt need.

# Meetings

## Electric Club of Los Angeles Takes Part in Parade

The week of May 21 was celebrated as "Better Music Week" in Los Angeles, and was ushered in by a spectacular parade on the evening of Saturday, May 19. In this parade were various types of floats and automobiles, decorated with flowers and bunting, while some of the floats were magnificently decorated and arranged with papier maché models, such as the ones entered by the Bureau of Power & Light, the combined florists of the city and some of the various music houses.

The Electric Club was well represented with a float which was gaily decorated with flowers and various colored lights. This float consisted of a high truck on which was mounted a 350-hp. Fiat gas engine, directly connected to a 100-kw. generator which produced the electric current used to illuminate the lights and for the two large searchlights which followed on either side of the truck on trailers.

The searchlights were 40 in. in diameter and two of the largest in the West, they being capable of producing 2,500,000 cp. for each lamp. These caused a considerable amount of attention as they came down Broadway, flashing down the streets and on adjacent buildings. On top of the truck was mounted an illuminated sign with the words "The Electric Club."

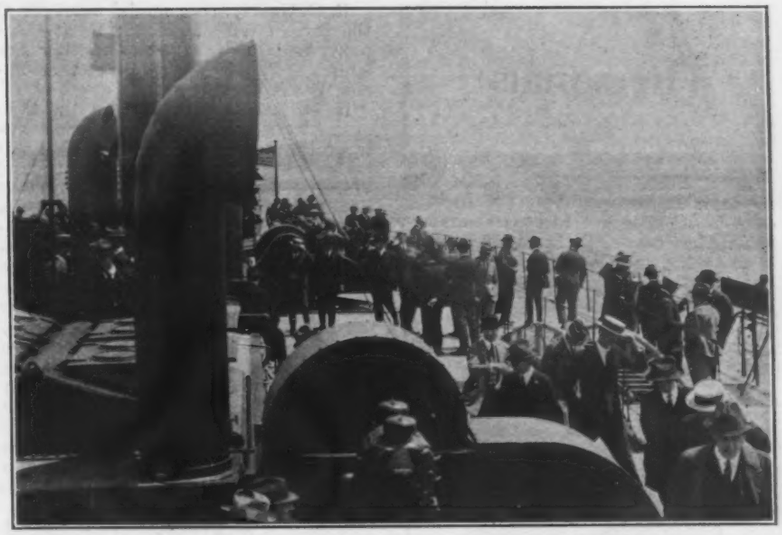
The equipment that was used was furnished by Otto K. Olsen, of the Illuminating Company, of Hollywood, and was assembled by Mr. Olsen. The committee responsible for the Electric Club's showing in this parade consisted of: G. E. Arbogast, H. F. O'Brien, E. R. Northmore, H. F. Rea, Otto K. Olsen, and H. B. May, Jr.

## California Rivers Are Subject of Power Board Survey

The Federal Power Commission recently authorized the creation of an interdepartmental board for the study of certain streams in California. The governor of California has been requested to appoint a member to the board.

The board has been created for the purpose of giving consideration to various problems and for recommending to the Commission what manner or plan of development will in its judgment be the best adapted to a comprehensive scheme of development in the interests of the people of California. The board will consist of D. C. Henny, U. S. Grant, III, and E. W. Kramer.

The board will consider three separate cases and will make individual reports on each subject covered. The three reports will be made on, the best scheme of development of the American River and its tributaries above Folsom; the proposed diversion of the waters of the Trinity River into Sacramento Valley for power and irrigation purposes; and the best scheme of development of the North Fork of the Stanislaus River.



Members of the electrical industry in the San Francisco Bay region on the hurricane deck of the ferry Hayward. The vessel is the first turbo-electric ferry boat ever constructed.

## San Francisco Bay Men Guests on Turbo-electric Ferry

Members of the San Francisco Electrical Development League, the Electric Club of Oakland, and the Engineers' Club of San Francisco, to the number of about 500, were the guests of the San Francisco Oakland Terminal Railways Company on board the ferry Hayward on May 28. The railway company took the electrical men for an hour and a half trip around San Francisco Bay, serving luncheon en route.

The guests were permitted to visit any part of the new electrically driven vessel. The Hayward is the first turbo-electric ferry boat ever constructed and the operating machinery was particularly interesting to the visitors. Two General Electric motors of 1,200-hp. capacity each are installed in the vessel, one in each end. The aft motor drives the boat while the forward motor operates at slower speed. A turbine connected to a direct current generator of General Electric manufacture, delivers current at 3,000 volts for operating the driving motors. The motors are direct connected to the propeller shafts and operate at 125 r.p.m. The speed of the new boat is about 15 m.p.h.

The San Leandro, a sister ship of the Hayward, will be put on the run between San Francisco and the Key System Mole as soon as it is completed. The Hayward has been in service during the rush hours since June 1.

### COMING EVENTS

**Pacific Coast Electrical Association—**
Annual Convention—San Francisco, Calif.
June 19-22, 1923

**Northwest Electric Light and Power Association**
Annual Convention—Seattle, Wash.
June 27-30, 1923

**Rocky Mountain Division — National Electric Light Association—**
Annual Convention—Glenwood Springs, Colo.
Sept. 17-19, 1923

**Colorado Public Service Association—**
Annual Convention—Glenwood Springs, Colo.
Sept. 17-19, 1923

**American Institute of Electrical Engineers—**
Pacific Coast Convention—Del Monte, Calif.
Oct. 2-5, 1923

## Substation Is Visited by Utah Electrical Engineers

The Utah section of the American Institute of Electrical Engineers made its last meeting for the 1922-23 season the occasion of a very interesting trip to the Terminal substation of the Utah Power & Light Company, situated about 7 miles west of Salt Lake City. The meeting was held on the evening of May 31. Dinner was served in the substation building.

Following the dinner a business meeting was held to consider the matter of enlarged activities of the Engineering Council of Utah and the election of officers. The meeting was presided over by C. C. Pratt.

The recommendation of the nominating committee for officers for the ensuing year was unanimously adopted and officers were elected as follows: chairman, C. R. Higson; secretary-treasurer, Hiram W. Clark; C. C. Pratt, P. P. Ashworth, A. M. Bohnert, J. A. Kahn, Wm. M. Scott, members of the executive committee.

After adjournment of the meeting the remainder of the evening was spent in an inspection of the Terminal substation yard and buildings. The entire trip was very successful, and it is the intention of the Utah section to conduct such an inspection trip as the final meeting for each year in the future.

**The American Electrochemical Society** will hold its next meeting in Dayton, Ohio, Sept. 27-29. Round table discussions on important subjects will be held during the meeting. Several important papers relating to electrochemistry will also be read at that time.

**The Custer County Electric Company,** which is to build and operate a power plant at Westcliffe, Colo., has been incorporated by C. B. Beardsley, George L. Beardsley, and Leo C. Mercier.

# Personals

**Eli F. Bush,** formerly connected with the sales department of the Los Angeles office of the Western Electric Company, has resigned to join his twin brother in the practice of law in that city. Mr. Bush has been with the Western Electric Company for the past two and a half years and before coming to Los Angeles was in the Philadelphia office of the Westinghouse Electric & Manufacturing Company. Mr. Bush is a graduate of the University of Michigan. Upon completing his course he entered the Pittsburg works of the Westinghouse Company, going to the Philadelphia office after finishing the apprentice course. The study of law has been confined to spare time and Mr. Bush gives credit to John J. Gibson, present vice-president of the Westinghouse Company, for inducing him to take up this spare time work. He took the California bar examinations in January and was admitted to practice in March. Mr. Bush and his brother are responsible for the mock trials which have been conducted by the Western Electric Company and the S & H Service Electric Company of Alhambra with such success. Mr. Bush will retain his membership in the Los Angeles Electric Club.

ELI F. BUSH

**Walter J. Conlon** and **Fred E. Hazard,** officials of the Conlon Electric Washer Company, along with **Enoch B. Seitz,** secretary of the Washing Machine Manufacturers' Association, all with headquarters in Chicago, recently took a vacation trip to Colorado, spending most of their time in Colorado Springs.

**H. J. Gundlach,** general manager, and **George Lowe,** purchasing agent, of the Mine & Smelter Supply Company, in Denver, have gone East on their semi-annual "shopping" tour. They attended the Electrical Supply Jobbers' Association convention in Virginia and spent considerable time at the Westinghouse headquarters in Pittsburgh.

**Sidney B. Paine** of the Boston office of the General Electric Company is a recent Pacific Coast visitor.

**R. G. Gentry,** commercial manager of the Denver Gas & Electric Light Company, and his family are visiting Los Angeles, San Francisco and other Pacific Coast points.

**H. D. Randall,** manager of the General Electric Company in Denver, entertained **Robert Sibley,** consulting editor of the Journal of Electricity and Western Industry, at a dinner in that city May 19, while en route east in the interests of development of the Colorado Basin. A number of Rocky Mountain utility men were guests of the occasion.

**W. H. Griffin,** topographic engineer for the United States Geological Survey, is in Salt Lake City to take charge of the several survey parties to go out into Boxelder, Tooele, Utah and Salt Lake Counties for surveys incident to the making of topographic maps. The survey is to be made on a cooperative basis between the counties and the federal government, each furnishing an equal share.

**V. L. Board,** general superintendent of the Denver Gas & Electric Light Company, has been appointed a member of the industrial development board of the Denver Civic & Commercial Association by its newly elected president, Elais M. Ammons, former governor of Colorado.

**Ely C. Hutchinson,** vice-president and general manager of the Pelton Water Wheel Company, has returned to San Francisco from a month's business trip in the East. Mr. Hutchinson spent most of his time at Philadelphia, the headquarters of Wm. Cramp & Sons Ship & Engine Building Company, associate of the Pelton Company, where he conferred with H. B. Taylor, president of the Pelton Company, and with other officials of the Cramp Company. He also visited the New York office of the Pelton Company.

**Jerry O'Connell,** formerly construction superintendent with the Pacific Gas & Electric Company, is now electrical engineer for the Modesto Irrigation District at Modesto, Calif.

**Leo J. O'Brien** of the electrical heating and cooking department of the Pacific Gas & Electric Company of San Francisco, was a recent Los Angeles visitor.

**S. Herbert Lanyon,** sales engineer of San Francisco, together with Mrs. Lanyon, left on May 26 for an extended trip to the Atlantic seaboard, and while in New York will attend the convention of the National Electric Light Association.

**Roy L. Anderson,** Sacramento district representative for the California Corrugated Culvert Company, has been promoted to the position of sales manager for the Los Angeles territory of the company.

**W. S. Rosplock,** formerly connected with Westinghouse Electric & Manufacturing Company, Los Angeles, and in charge of their publicity work in that section prior to the first of the year, is now with the Pacific Manufacturing & Electric Company, manufacturers of the Everhot water heater, in the capacity of salesman and field representatitve.

**W. A. Alden,** industrial lighting specialist of the Westinghouse Electric & Manufacturing Company, Los Angeles office, is in the East visiting the South Bend works of that company, formerly the George Cutter Company.

**Clare N. Stannard, R. G. Gentry** and **George W. Bixler,** officials of the Denver Gas & Electric Light Company, are among those on a committee of prominent business men in Denver who have launched a campaign to raise the balance of $100,000 required for the municipal tourist bureau advertising fund.

**J. C. Thompson,** assistant treasurer of The California Oregon Power Company, has been spending a short time at Riddle and Myrtle Creek, Ore., endeavoring to complete arrangements for the extension of the power line to connect those towns with the main power line operated by the company. Efforts are being made to secure the right-of-way and as soon as this is obtained, work of construction will be started. The company hopes to have the power ready for use by the towns by the first of June.

**Clifford E. Mong,** transmission engineer of the Pacific Telephone & Telegraph Company, addressed the May meeting of the Seattle section, A.I.E.E. on "A Typical Installation of a Telephone Long Distance Toll Cable," illustrating his talk with charts and diagrams.

**C. R. Higson,** assistant to the general superintendent of the Utah Power & Light Company, at Salt Lake City, has been elected chairman of the Utah section of the American Institute of Electrical Engineers. The election took place at the section's meeting on May 31. Mr. Higson graduated from the University of Wisconsin in 1907, and immediately thereafter became associated with the General Electric Company at Schenectady, N. Y., where he remained for about a year and a half. He then became instructor in electrical engineering at the University of Wisconsin until 1911. During that year he entered the employ of the Utah Light & Railway Company at Salt Lake City, and the following year, when the Utah Power & Light Company was organized, he became identified with its engineering and operating department. He now holds the position of assistant to the general superintendent of that company. Mr. Higson was born in Salt Lake City, and secured his early education in the schools there. He is an enthusiastic worker, and takes a very keen interest in Institute activities and electrical engineering matters in general.

C. R. HIGSON

**H. J. Mayo,** southern California representative of the Benjamin Electric Manufacturing Company, has just returned from an extensive trip in the East where he visited the main plant of his company at Chicago.

**V. G. Fullman,** sales manager of the Steel City Electric Company, Pittsburgh, Pa., manufacturers of Fullman floor boxes, condulet and steel outlet boxes, recently spent several days in Los Angeles, with their local representatives, Allied Industries, Inc.

**J. E. Krilly,** district line material specialist, of the San Francisco office, Western Electric Company, was a recent Los Angeles visitor. Mr. Krilly has just returned from the East and while in Los Angeles was engaged on several jobs with the Western Electric Company representatives in that city.

**E. E. Carpenter,** member of the firm of Baker & Carpenter, consulting engineers, San Francisco, has been made chief engineer of the British Columbia Electric Railway Company, Ltd., Vancouver, B. C. Mr. Carpenter is a graduate civil engineer from Stanford University with the class of 1898. For seven years following his graduation he practised railway engineering with the Southern Pacific, Western Pacific and Nevada Northern railways. He was chief construction engineer for Sanderson & Porter in the installation of the Stanislaus River power development for the Sierra & San Francisco Power Company. He supervised the Jordan River development of the British Columbia Electric Railway Company and was chief engineer for Sanderson & Porter on the Victoria, B. C., water supply development. Mr. Carpenter was chief civil engineer of the Panama-Pacific Exposition and during the war was chief engineer and manager of the Sanderson & Porter ship building project at Raymond, Wash. More recently he was executive engineer and project manager of the Stanford Stadium,

E. E. CARPENTER

which has a seating capacity of 60,000, and at the present time is a member of the California Memorial Stadium Commission, which is supervising the construction of an athletic stadium at that university with a seating capacity of 72,000. Mr. Carpenter is a member of the American Society of Civil Engineers and the American Association of Engineers.

**John D. Isaacs,** consulting engineer for the Southern Pacific Company and one of the leading figures in the world of railroad engineering, has retired from active service. Mr. Isaacs is credited with being the inventor of the device which marks the birth of the moving picture industry.

**F. E. Johnson, Jr.,** vice-president of the M. W. Kellogg Company of Jersey City, is in San Francisco on one of his periodical trips in connection with the various lap-welded steel pipe installations that the company is making for Western power companies. While in San Francisco Mr. Johnson is making his headquarters with the Pelton Water Wheel Company, Pacific Coast representatives of the Kellogg Company.

**Herbert Nunn,** former state highway engineer of Oregon, was appointed general manager and engineer of the Contractors' Association of Northern California on June 4. As chief engineer of the Multnomah County (Ore.) system of highways and as state highway engineer of Oregon, Mr. Nunn has, during the past eight years, been in charge of the Oregon state highway system, including the Columbia River highway. The membership of the Contractors Association is composed principally of general contractors engaged in state, county and city highway and other heavy construction in Northern California. Its head office is in San Francisco.

**W. C. Finely,** erecting engineer for the Pelton Water Wheel Company, is at Ocean Falls, British Columbia, where he is installing a 6,300-hp. Pelton double-overhung reaction turbine at the power plant of the Pacific Mills, Ltd. The new turbine is of the same general design as the three Pelton units installed for the company four years ago. These have a capacity of 8,700 hp., which, when the new turbine is installed, will give a total of 15,000 hp., supplying all the power required for the company's pulp and paper mills.

**J. I. Colwell,** Seattle manager of the Western Electric Company, attended the annual convention of the National Electric Supply Jobbers Association held in Hot Springs, West Virginia, May 23-26. After this convention, Mr. Colwell went to New York City to attend the annual convention of the National Electric Light Association. Mr. Colwell will be away from Seattle for about 30 days.

**Gerard Swope,** president of the General Electric Company, arrived in Salt Lake City on May 24, and spent several days in that city. On the evening of May 24 Mr. Swope was the guest of honor at a dinner given at the Alta Club by Robert Miller, local manager of the General Electric Company. In a brief address Mr. Swope called attention to such projects as the proposed American Falls, Idaho, reservoir and the Boulder dam in the Colorado river as projects that will mean the development of a vast amount of electricity for the west. He predicted considerably more railroad electrification and countless other uses to made of the cheap electric power which would thus de developed. Governor Charles R. Mabey and Lafayette Hanchett also made brief addresses. Robert Miller acted as toastmaster.

**Harry L. Pearson** has been made engineer of the distribution department of the El Paso Electric Railway Company, in charge of the distribution system of that central station. Mr. Pearson was born in Pocatello, Ida., coming to El Paso in 1907. He was graduated from Massachusetts Institute of Technology in 1922. Upon his graduation he was commissioned second lieutenant, Coast Artillery O.R.C., and is at present assigned to the 508th Anti-aircraft Regiment. He entered the employ of the El Paso Electric Railway Company in

HARRY L. PEARSON

1922 as a meter tester. He was later promoted to assistant superintendent of distribution, and he has just recently been made distribution department engineer for the company.

**P. H. Booth,** sales manager of the Edison Electric Appliance Company, with headquarters at that company's factory at Ontario, Calif., has been elected to the Board of Freeholders of the City of Los Angeles which is charged with framing a new charter for that municipality.

**Dan Harley,** formerly with the Montana Power Company in Butte, has been made manager of the Deer Lodge Electric Company at Deer Lodge, Mont.

**L. B. Reynolds,** civil, hydraulic and sanitary engineer, has been appointed professor of civil engineering at Stanford University to succeed **C. D. Marx,** who has resigned and who now becomes emeritus professor. Mr. Reynolds is a graduate of Stanford and is a noted figure in the engineering world.

**H. B. Cannon,** formerly electrical superintendent of the Napa district for the Pacific Gas & Electric Company has been transferred to Modesto as general foreman.

**J. C. Masek,** theatre switchboard engineer, of the Westinghouse Electric & Manufacturing Company, East Pittsburg works, has been in Los Angeles for several weeks investigating theatre switchboards installed in the local theatres, and planning new switchboards for theatres under construction, with the local Westinghouse switchboard engineers, R. C. Stackhouse and H. S. Warren.

**H. D. Crain** and **Charles C. Holmes** have recently joined the Los Angeles office of the Western Electric Company and are in the sales force as specialty appliance salesmen.

# Manufacturer, Dealer and Jobber Activities

**The P. A. Geier Company,** manufacturer of the Royal cleaner, has announced that through the activities of its Los Angeles jobber, California again leads in a sales contest being conducted by the company. Listenwalter & Gough are the Los Angeles jobbers for the manufacturing company. Five of the ten leading contestants are Californians and the Pacific Coast has twenty-two of the first sixty positions.

**The Apex Electrical Distributing Company,** Cleveland, Ohio, has sent out to its dealers an illustrated booklet describing and showing the advertisements to be run in the national magazines in advertising Apex-Rotarex products. The booklet also shows advertisements of which electro-plates have been made and which are available for dealers who wish to tie-in their advertising with the national campaign.

**The Cooper storage battery** is now being stocked by the New England Electric Company in Denver, according to a recent announcement of that company.

**The Edison Electric Appliance Company** is refitting its San Francisco sales office which is located at 155 New Montgomery Street. The company intends to make quite an elaborate show room, displaying heavy duty bake oven equipment and electric ranges in addition to the appliance line that has been shown in the past.

**The Westinghouse Electric & Manufacturing Company** has issued Leaflet No. 1867, which describes electrical equipment for coke plant machinery. Illustrations of the uses of electricity in byproduct plants are shown with recommendations as to the various types to be used.

**The Square D Company,** Detroit, Mich., has recently introduced a new vacuum tube socket for radio sets. The new socket accommodates a four-pronged tube and can be mounted either horizontally or vertically. The device is made of black porcelain.

**Charles Weaver** has started an electrical contracting and repair business at 1709 East 38th Street in Los Angeles, Calif. Mr. Weaver will specialize in motor installation and maintenance as his establishment is located in the industrial center of Los Angeles.

**The Electric Power Equipment Corporation,** Philadelphia, Pa., has recently announced that increased business has made it necessary for the company to move its factory to a new and larger building. A completely modern building is now being used by the company as a location for its factory, where high tension equipment is manufactured. The new address of the company is 412 North 18th Street, Philadlphia.

**Betts & Betts Corporation** has recently published Radio Bulletin No. 188, which supersedes Bulletin No. 180. The bulletin contains complete description and illustrations of the radio equipment manufactured by the company. The console cabinets, which the company is introducing, are described at considerable length.

**Hobart Brothers Company,** Troy, Ohio, has recently published three leaflets describing HB constant potential battery charging sets manufactured by the company. Details concerning operation of the sets are given in the leaflets.

**Listenwalter & Gough,** electrical jobbers of Los Angeles, Calif., have moved to new headquarters at 819 East First Street.

**The Colonial Lighting Fixture Company,** of Portland, Ore., has been using an inexpensive means of keeping its name before the public. The company purchased from a printer small blotters which are of extremely attractive design. A river scene, reproduced in two colors, appears on the blotter, and space is left for the name of the company, along with an announcement of the line that is carried by it. The blotter is small and is a good one to send to women customers.

**The Manhattan Electrical Supply Company, Inc.,** New York, has prepared two leaflets describing the dealer-aids that have been prepared for dealers who are handling Red Seal batteries. Illustrations of display racks and suggested window trims are contained in the folders.

**The Line Material Company,** South Milwaukee, Wis., has designed a new petticoat insulator especially adapted for breaking street lighting circuits. Both grooves on the new insulator are ¾-in. in diameter and the leakage distance between grooves is 2 in. The new insulator takes the place of special break arms or the regular 8,000-volt petticoat insulator and two strain insulators.

**The C. F. Pease Company,** Chicago, Ill., has recently placed on the market a new machine for drying blue prints, negative prints and all kinds of photographic prints. The device known as the Pease sheet dryer can be heated electrically and is operated by a ⅛-hp. motor.

**Sangamo Electric Company,** Springfield, Ill., has issued Bulletin No. 61 which gives instructions for the installation and repair of Sangamo Type-H single and polyphase watthour meters. The bulletin is well illustrated and the text is particularly clear.

**The Rogers Electric Laboratories Company,** Cleveland, Ohio, has issued a folder describing its new model "Rogers-Quality" hotplate.

**The Driver-Harris Company,** Harrison, N. J., has recently published Data Book R-23. The bulletin is entitled "Alloys for Electrical Resistance." It contains up-to-date information concerning the various alloys used for heating elements in electric heaters of all kinds. Resistances of all of the various alloys manufactured by the company for wire making are given and graded according to wire sizes.

**The Hurley Machine Company,** Chicago, Ill., is placing on the market a new electric vacuum cleaner to be manufactured under the trade name Hurley Thor No. 77 electric brush type cleaner. One of the features of the new cleaner is the driving mechanism provided for rotating the brush. The brush in the new appliance is driven by phosphor bronze and hardened steel gears, a friction cluth being used to eliminate the danger of stripping gears. A self-adjusting nozzle is another feature of the cleaner. A 1/7-hp. General Electric motor is used to drive the suction fan.

**The Rome Wire Company,** Rome, N. Y., has recently published a new price list on its line of cords and wire cables. The company's product is known as Super Service Cord and cable..

**Altorfer Brothers Company,** Peoria, Ill., has published a small booklet, for retail distribution, entitled, "The A. B. C. of Wash-Day." The attractive piece of literature contains a detailed description of the A. B. C. line of home laundry equipment, including washing machines and ironing devices.

**Judging from the smiles emanating from the faces of the Apex-Rotarex department members of the North Coast Electric Company, one would say that business is exceedingly prosperous in Seattle, Wash. These men and women were all so busy "peddling" and servicing their wares that it was with difficulty that the photographer prevailed on them to "take time-out" to have their picture taken. Harry Byrne, president of the North Coast Electric Company, which operates stores and shops in Seattle, Portland, Tacoma and Spokane is standing to the left of the washing machine, with his hand on the control.**

# Trade Outlook

## San Francisco

A large amount of construction is under way in the San Francisco Bay region, but the erection of large apartments has abated some. In the report of the Federal Reserve Bank, it is stated that the demand for certain raw materials such as lumber and metals "is not so insistent" as it was at the first part of the year. The stocks of lumber in retailers' hands have increased some and there is a tendency to purchase for immediate needs.

There are indications of a slackening of business in general despite the fact that the volume of business continues large and sales are considerably in excess of last year. There are evidences of buyers avoiding price advances and that they are expecting price declines.

Manufacturing continues active, with several additions to the assembly plants of the district. Several firms have recently located warehouses in San Francisco and Oakland in order to better supply the needs of the section.

There is little if any involuntary unemployment and wages are higher in the farming and fruit-growing sections. Industrial labor is also receiving a good scale.

Intercoastal and foreign shipping is continuing to hold up. Bank clearings show a considerable increase over last year.

## Los Angeles

Los Angeles building records for May totaled 5,184 permits with a valuation of $18,926,881. This closely approaches the figures for March of this year which hold the record for any single month in the history of the city. The total for the first five months of 1923 is 24,584 permits with a valuation of $78,814,739. This is almost equal to the entire year of 1921 when the final check-up showed $82,000,000. During May there were permits taken out for seven factories, valuation $2,215,591, and 21 industrial buildings, $121,743.

Los Angeles clearing house smashed all records in May with a total of $539,795,391.80. This is $161,012,528.12 in excess of the total for May of 1922, when the month's business was $438,772,763.68. The closest approach to May this year was made in March when the total was $579,770,678.

The value of imports and exports at Los Angeles Harbor totaled $5,246,416 in May, according to estimated figures released yesterday at the office of Collector of Customs. This total is $1,707,554 in excess of the total of import and export values for May, 1922.

An indication of the optimism prevailing in Los Angeles is shown by the result of the election on June 5, when the voters authorized the issuance of $26,500,000 in bonds for public improvements. The $35,000,000 power bonds for the Bureau of Power & Light failed to get the necessary two-thirds vote, however they received a majority vote.

The electrical industry has been receiving a fair portion of the increased business in the city and is in a good condition. Contractors have been kept busy installing up-to-date wiring in the buildings and homes being erected.

## Salt Lake City

The advent of summer weather in this section has been rather backward, which has had some effect upon general business. Industrial activity, especially mining, continues to increase, and with the summer building activity now well under way, merchants and business men generally are looking forward to a busy season.

Agriculturists in this section have a prosperous year ahead, in the opinion of recent investigators of crop conditions. Increased production in most all agricultural products is predicted.

In the mining field new properties are being opened up, and in some localities mining activity is greater than it has ever been. A marked increase is noted in the use of electric power in mining, and during the past few months several new installations have replaced steam-operated equipment.

Electrical jobbers continue to report conditions as very much improved compared with last year. Retailers are devoting considerable effort to the sale of appliances, with good results.

Credits and collections are better than for some time past. Employment is being furnished to a considerable number of people, both in skilled and unskilled labor, and there seems to be a continuous demand for men in the mining districts. There is practically no unemployment.

Postal receipts show that conditions have been improving throughout the past year. It is expected that the improvement will continue until fall, at least.

## Denver

A new high record in building permits was established during May, with a total of $3,024,800, thanks to the issuances made on the last day of the month, which included the million dollar hospital and medical school of the University of Colorado. For the first five months of 1923 building activities have shown an increase of $2,046,450 over the corresponding period of the previous year.

There is a marked improvement in both basic industries and trade although weather conditions have retarded farm operations. In mining, production of lead and zinc ores has been maintained at near war-time records. Silver mining is somewhat unstable owing to the approaching expiration of the Pittman act. Bituminous and lignite coal production is running ahead of last year. Petroleum output is the heaviest ever recorded.

Generation of electric power is rising and central stations report satisfactory outlooks with several exceptions. Appliance trade is not brisk while vacuum cleaner business is good. Washing machines are moving gradually. Owing to cool weather there has been little demand for fans as yet. A good range business is reported out in the state.

## Portland

Reports from the principal lumber manufacturing centers show that lumber is being produced at an increasing rate, the production of lumber for the week ending May 28 being 23 per cent above normal. During the same week there was a slight falling off of orders, which is attributed to the fact that dealers, who until now have had difficulty in supplying the trade, are now well stocked. The slackening of the building construction in many parts of the country because of excessive building costs, has also had its effect.

Large lumber operators have expressed the opinion that lumber prices may be forced to a lower position. No intimation has been made as to when any decline may be expected. The opinion is that any reduction will be a small one.

Building records for May of this year showed a small loss over the same month of 1922, but the total for the year to date is slightly ahead of last year. About 45 per cent of all building is for residence purposes. Construction work is going on in all parts of the city and there is some scarcity of skilled labor.

Bank clearings for May for all Portland banks totaled $158,524,239 which was 25 per cent gain over May of last year. The increase is largely due to greater activity in the lumber industry.

The electrical jobbers report some improvement in collections.

## Seattle

The month of May building activities record showed permits issued for more than $1,500,000 of new work, and this, with the heavy volume of building now under way, places the construction program for the city in good condition. Reports from various parts of the state indicate a slight dropping off in building, but this condition has not obtained in Seattle, and no marked let-up is predicted until late in the fall.

Deposits are holding up well, business and industry making no unwarranted demands for credit extensions, and a general tone of optimism is prevailing among the banking fraternity. Public work of all kinds, especially street and highway construction, has been very heavy all spring.

The satisfactory volume of work carried on by the electrical contractor-dealers during the spring and early summer is holding up and is expected to be maintained until well into the fall months. Prices of electrical equipment, devices and materials are still increasing, and it is believed the peak is yet to be reached. At present, there is a shortage of iron conduit, and little relief is expected before late in the summer. Heavy constructional programs by telephone companies and power companies in this district have created an active demand for outside construction material. Seattle contractors are now engaged in preparing estimates for wiring on the proposed new Olympic Hotel, the wiring work costing well over $100,000.

# Construction News

## Bridges

**Calif., Martinez**—The Contra Costa County Board of Supervisors has awarded a franchise to the Delta Bridge Company for the construction of a bridge across the San Joaquin River between Sherman Island, Sacramento County, and a point four miles above Antioch in this county. According to the specifications the bridge will be 3,675 ft. long with a 200-ft. draw and will be of the low level type, being only 12 ft. above the water at high mark. The cost will be $600,000. Under the terms of the franchise the bridge will revert to the counties of Contra Costa and Sacramento at the expiration of the franchise period of twenty-five years.

**Calif., Hanford**—The Board of Supervisors has awarded the contract for building the 210-ft. reinforced concrete bridge across the North Fork of the Kings River, on the Lemoore-Browndale highway, to Nate Lovelace, on his bid of $22,408.80. The county will furnish the cement, separate contract for which was given the Deacon Lumber Company.

**Calif., Shellville**—Davidson & Nicholson, Stockton, submitted low bid for constructing reinforced concrete bridge of two 40-ft. girder spans, with necessary pier, abuttments and wing walls over Arroyo Seco Creek near Shellville, Sonoma County.

**Wash., Kelso**—Contracts for rebuilding of the Yale-Yacolt and Yale-Cougar bridges over Speile Creek in the Upper Lewis River country have been awarded to Albert Burcham, who is also building a bridge over Owl Creek on the Shanghai Highway.

**Wash., Okanogan**—Bids will be received until June 25 by the Okanogan County Commissioners for constructing a five-span concrete arch bridge across the Okanogan River at Omak. The structure will be 408 ft. long, with a 20-ft. roadway, and 5-ft. sidewalks, and will involve 142,000 lb. of reinforcing steel, 13,000 ft. of piling and 2040 cu. yd. of concrete.

**Wash., Everett**—All bids for the construction of a new span across the Stillaguamish River, estimated to cost $60,000, were rejected by Snohomish County Commissioners, and new bids will be called. Low bid was that of Union Bridge Company, Seattle, $64,879. Structure will be 210 ft. long.

**Wash., Aberdeen**—City council recently passed an ordinance providing for a $150,000 bond issue for a new bridge over the Wishkah River, which will be submitted to voters at early election.

**Wash., Ellensburg**—Union Bridge Company Seattle, received the contract for a new steel bridge across the Yakima River near Cle Elum, on its bid of $49,897.

**Wash., Chehalis**—Contract for the proposed new 220-ft. steel bridge to be built at Bremer by the Lewis County Commissioners, has been let to Monson & Trierweiler, Portland, for $23,292.

**Wash., Seattle**—King County Commissioners awarded contract for Mercer Island bridge in King County to J. R. Wood, Seattle on his bid of $43,990.

## Buildings (Industrial)

**Calif., Berkeley**—A concrete factory is being erected by the Built-in Fixture Company at Parker Street and San Pablo Avenue. Site and building will cost $35,000.

**Calif., Tulare**—Southern California Edison Company has completed arrangements for the purchase of a lot on L Street, between Tulare and King Streets for the site of a $20,000 garage, store room, and office building, which the company proposes to erect to house the local branch. J. R. Haskins is manager of the local office. The building will be 86 x 100 ft. of brick and concrete construction, similar to other buildings the company is erecting in outlying towns.

**Calif., Oakland**—Plans and specifications for the first unit of the Victor Talking Machine Company's $750,000 plant on the 10-acre tract on Seventy-seventh Avenue, south of East Fourteenth Street, are completed and construction work, it is expected will be started in the near future.

**Calif., Los Angeles**—Actual construction work was begun this week on the first building unit of the Pioneer-Pacific Worsted Mills Company, according to an announcement made at the general offices of the company. The plant will be on a site of 25 acres near Central Avenue, adjoining the Watts-Redondo line of the Pacific Electric, facing 108th Street. The worsted mills buildings will cost in the neighborhood of nearly $1,500,000. The main plant will be 225 ft. by 550 ft. in size. The company will employ 450 workers.

**Calif., Los Angeles**—Architects Walker & Eisen, 325 Pacific Finance Building, are preparing plans for a 2-story and basement factory building to be erected at Vernon for the Hoyt Heater Company. Dimensions, 100 x 125 ft., brick walls, reinforced concrete frame and floors, steel sash, composition roofing, metal skylights, elevator.

**Calif., Los Angeles**—Architects Corwin & Merrill, 3981 W. 6th Street, are ready for subfigures for erecting a brick factory building, on Santa Fe Avenue for A. B. Rice. Foundation 110 x 60 ft., pressed brick facing, composition roofing, cement floors, metal skylights, wood trusses, wire glass.

**Calif., Los Angeles**—Frank D. Chase, Inc., engineers, 533 Title Insurance Building are completing plans fo a 6-story, Class A industrial building, to be erected on Downey Road, Central Manufacturing District, for the Los Angeles Central Manufacturing District. Reinforced concret construction, 6-story and basement, U-shape, 260 x 160 x 140 x 90 ft., 10-story tower, brick exterior, walls, terra cotta trim, concrete and maple floors, composition roofing, tower to contain 150,000-gal. water pressure tanks, freight and passenger elevators, sprinkler system, steel sash, steel rolling doors. Concrete and brick work to be done by day work, bids on all subcontracts to be taken next week.

**Calif., Los Angeles**—Joseph F. Rhodes, 414 Central Building, has prepared plans and will erect a 4-story and basement brick factory building on Imperial Street, between 6th and Jessie Streets, for Pacific Coast Biscuit Company. Dimensions, 120 x 134 ft., brick walls, structural steel, face brick, plate glass, steel sash, composition roofing, metal skylights, fire escapes, elevator, wood and cement floors, $130,000.

**Calif., Los Angeles**—Hamm & Grant, Inc., 607 Ferguson Building, have prepared plans and will erect a 1-story factory building on Orange Street, south of Santa Monica Boulevard, for A. J. Braasch Heater Company. Dimensions, 45 x 150 ft., wood frame, corrugated iron exterior and roofing, wood trusses, steel sash, cement floors.

**Calif., Los Angeles**—Architect Albert C. Martin, 430 Higgins Building, is preparing plans for a 3-story and basement Class A factory and warehouse building, to be erected on E. 7th Street, near Utah Street, for Wm. Wolker Furniture Company. Dimensions, 100 x 247 ft., reinforced concrete construction, steel sash, composition roofing, metal skylights, 3 elevators, steel rolling doors, sprinkling system.

**Calif., Los Angeles**—Weymouth Crowell Company, 2026 W. 9th Ctreet, has been awarded a contract for all work complete for erecting a 3-story and basement class A mercantile building, at 8th and San Pedro Streets for United States Rubber Company. The building was designed for a 5-story. Richard D. King, 519 Van Nuys Building, architect. Dimensions, 142 x 122 ft., reinforced concrete construction, plaster exterior, brick trimmings, plate and wire glass, steel sash, elevator, spiral chutes, dumb waiter, gas heating, $200,000.

**Wash., Tacoma**—The Terminal Lumber Company, here, plans the purchase of a 30-acre site, on which will be erected a modern re-sawing and re-manufacturing plant to serve inland sawmills. Plant will employ 200 men.

**Wash., Vancouver**—Northwestern Equipment Company of Seattle has leased a 6-acre site here, which will be used to establish a branch plant, for the manufacture of logging trucks. The site includes the old plate mill of the Standffer Shipbuilding Yards, which will be remodeled and equipped with manufacturing machinery.

**Wash., Seattle**—The Pacific Telephone & Telegraph Company will construct a 1-story addition to its garage, and a 2-story garage and repair building at 806 Fairview Avenue, at a total cost of $150,000. The addition will be 129 x 163 ft., of concrete and steel.

**Wash., Morton**—The Stinson Lumber Company plans the construction of a sawmill near Morton, where the company has a 25-year supply of timber. In addition, a townsite will be developed for the accommodation of the plant's 100 employees.

**Wash., Olympia**—The veneer plant of the Henry McCleary Timber Company here was recently destroyed by fire, with loss of $200,000. Plant will be rebuilt.

## Buildings (Miscellaneous)

**Calif., Lodi — Theater** — A. Salomon has announced that he will build a theater here at a cost of $175,000.

**Calif., San Francisco—Terminals**—L. R. Lurie has closed a deal with the Pickwick Corporation and the Pacific Auto Stage Lines, whereby ground has been leased for a period of 99 years, located on the southeast corner of Fifth and Jessie Streets, running through to Mission Street. A fireproof depot will be erected containing three floors and basement, the entire area of which will be approximately 60,000 sq. ft. Plans approved by Charles Wren of the Pickwick Corporation and Floyd Hanchett of the Pacific stage lines are the result of close study of the most modern depots in the United States. The entire fleet of cars operated by the two companies can be handled at this terminal. Construction work will start within a few weeks.

**Calif., San Francisco — Apartments** — Daniel McKillop is planning the erection of an apartment structure on Geary Street west of Hyde, to contain five stories and basement; cost is estimated at $75,000.

**Calif., Fullerton—Theater**—George H. Amerige, local pioneer, has had plans prepared for a modern theater building, 70 x 140 ft., 2-story, seating 1,300, which he plans to erect on a site east of the present Orange County Ignition Works. Cost, approximately $200,000.

**Ore., Portland—Apartments**—A 2-story apartment house costing $100,000 will be erected at the corner of 18th and Everett Streets by the Evermun Investment Company, according to the announcement made by J. P. Parker, president of the concern. The structure will cover a site 100 x 100 ft. and will contain four 3-room

apartments and twenty-two 2-room apartments. All will be equipped with electric ranges.

**Ore., Portland—School**—The Beaumont School is being planned by C. L. Goodrich, Abington Building, and is to cost approximately $175,000. It will be of brick and concrete construction, having 12 class rooms, assembly hall and manual training and domestic science rooms.

**Ore., Portland — Church** — The new Central Presbyterian church, costing $60,000, is to be of cement with stucco exterior and red tile roof. The location is East 32nd and Ankeny Streets, and the structure will be 3 stories in height of the Spanish-California mission style. F. Mason White is the architect.

**Ore., Astoria—Stores—Offices**—A 2-story and basement structure, 75 x 125 ft., costing $75,000, is being planned by Knighton & Howell, architects, United States National Bank Building, Portland. This is to be known as the Miller Jeffers Building and is to be located on 14th Street between Duane and Exchange, and is for stores and offices.

**Ore., Astoria—Hotel**—Plans have been prepared by William Bruce, Portland architect, for a 3-story hotel building to be erected for Thomas Randles on 20th Street between Commercial and Duane Streets in Astoria. The structure will have a ground floor space 120 x 50 ft., and will be of fireproof construction, the exterior walls faced with brick. There will be 25 rooms on each of the two upper floors.

**Ore., Portland—Apartments**—John H. Grant is preparing plans for a 4-story apartment house to be built on Glisen Street between 20th and 21st for the Commodore Investment Company. The building will cost about $250,000 and will cover a ground area of 90 x 139 ft. The walls will be of reinforced concrete faced with stone tone stucco. The design will follow the Spanish mission type; each floor will have 14 apartments, the majority of these being three rooms each. Another apartment house costing $100,000 is being planned by Charles W. Ertz, and will be located at 11th and Everett Streets. The details of the erection are being handled by Metzger-Parker Company. The building will be 100 x 100 ft. and will contain four 3-room apartments and twenty-two 2-room apartments, all of which will be equipped with electric ranges and other modern improvements.

**Ore., Salem—School**—The Salem high school is to have a brick addition 100 x 72 ft., 3 stories in height. There will be 14 class rooms in the addition at an estimated cost of $60,000. The plans were prepared by Fred H. Legge, Salem architect. W. H. Burghardt, the clerk of the Salem school district, is managing the bids.

**Ore., Salem—Gymnasium**—Trencheil & Parelius of Portland have received the contract for the erection of the new gymnasium in the Willamette University campus. The cost of the building will be approximately $75,000. Actual work on the structure has started; the building is to be 2 stories in height, of brick, and will be modern in every particular.

**Wash., Seattle—Federal Building**—Warrack Construction Company has been awarded contract for construction of a reinforced concrete federal building at Cordova, Alaska, to cost $90,000. The building will include a postoffice, court house and city jail.

**Wash., Seattle—Hotel**—Following bids were opened June 1 by building committee of the Community Hotel Corporation, Seattle, for the construction of the proposed Hotel Olympic. Grant Smith Company, Henry Building, Seattle, low, at $3,254,000; Amsterdam Building Company, New York City, $3,453,000; A. W. Quist, & Company, Seattle, $3,535,052; Sound Construction & Engineering Company, Seattle, $3,538,521; Dougan & Chrisman, Seattle, $3,456,255, and Rounds-Cliat Company, Seattle, $3,535,652. All bids were considerably in excess of the estimates of Architect J. Otis Post of New York City and Architect Chas. H. Bebb, of Bebb & Gould, Seattle, who are associated on the project. According to announcement made shortly after the bid opening, an additional million dollars' worth of bonds will be sold immediately to cover cost of the structure which, it is now estimated, will cost between three and one-half million and four million dollars. C. J. Smith is chairman of the executive committee of the board of directors.

**Wash., Spokane—Lodge**—A labor temple costing $75,000 is to be erected here. A. W. Johnston, chairman of the board of trustees.

**Wash., Seattle—Office**—The Cowley Estate will erect a 4-story fireproof addition to the business block at 1413 Fourth Avenue, to cost $80,000.

**Wash., Tacoma—Seminary**—The Annie Wright Seminary, here, plans the construction of a home to cost $600,000, to be ready for occupancy by September, 1924.

**Wash., Seattle — Apartments** — C. F. Martin, Seaboard Building, has the contract for erecting a 3-story and basement, brick veneer apartment building, containing 22 modern apartments, at 3008 Howard Avenue for P. E. Sullivan. Work will cost $60,000.

**Wash., Everett—Office**—H. C. Hodges and associates will erect a 5-story concrete building, costing $100,000, 48 x 115 ft., for use of physicians and surgeons.

**Wash., Seattle—Apartment**—Murdock & Eckman, Thompson Building, have received contract for a 2-story group of buildings, including three separate apartment structures and 24 garages. The construction will cost $200,000.

**Wash., Snohomish—School**—Snohomish School District will erect two 2-story additions to Snohomish schools during the summer, to cost approximately $80,000. Stephen, Stephen & Brust, architects, Seattle.

**Wash., Bremerton—Y.M.C.A.**—Lawton & Moldenhour, architects, Alaska Building, Seattle, are preparing plans for a 5-story and basement addition to the Navy Yard Y.M.C.A. to cost $150,000. Building will be 101 x 120 ft., steel and concrete.

## Highways

**Ariz., Phoenix**—Bills will be called for soon by state highway department, for paving four miles of the Marinette-Hot Springs Junction Road, west of Marinette. The pavement will be 18 ft. wide, 6 in. thick. A 130-ft. bridge across the overflow channel of Agua Fria river is included in specifications. Frank R. Goodman, Phoenix, state highway engineer.

**Ariz., National Park Road**—Bids are being received by superintendent of the Grand Canyon National Park, for surfacing with asphalt concrete, the Hermit Rim Road in Grand Canyon National Park, in accordance with plans and specifications on file at office of the superintendent, Grand Canyon, Ariz. Arno. B. Cammerer, acting director, National Park Service.

**Calif., Santa Barbara**—A road improvement district in Mission Canyon has been formed to pave a portion of the tunnel road which opens up the territory around the southern terminal of the tunnel to the Gibraltar dam. The district comprises approximately 1000 acres.

**New Mexico, Alamogordo**—A report from the capital states that an appropriation of $6,000 a mile has been approved for the 34-mile stretch of road between Oro Grande on the Alamogordo-El Paso highway, and work will be started soon. The ten concrete spillways between Alamogordo and Valmont are to be taken up and replaced. In Otero county the construction of a stretch of 12 miles between Weed and Pinon is projected. George Leslie of Santa Fe, representing the bureau of roads, surveyed the project a year ago, estimating the cost at $60,000. Forest service has offered to provide $45,000 if the county and state furnish the remainder.

**Wash., Bellingham**—Charles E. Lind, local contractor, and the Sloane Construction Company of Spokane, have been awarded the government contract to relocate 5.9 miles of the Mt. Baker Highway between Glacier and Excelsior. The bid was $119,695.

**Wash., Mt. Vernon**—Skagit County Commissioners have appropriated $80,000 for the construction of a five-mile highway into Anacortes. A like amount will be given by the state, and construction work will start during the summer.

**Wash., Bellingham**—Whatcom County Engineer Fred W. McElmon's plans for paving 2.5 miles of highway from Saxon to Wickersham have been approved by the state highway supervisor, and bids will be called for at once.

**Wash., Olympia**—State Highway Commission will receive bids until June 26 for the following highway work: clearing, grading and draining 11.32 miles of the Inland Empire Highway, between Palouse and Whitman in Whitman County; grading, draining and paving with concrete 1.3 miles of Inland Empire Highway, from Waitsburg northeast in Walla Walla County; constructing reinforced concrete arch bridge over Goldsborough Creek on the Olympic Highway in Mason County; constructing timber trestle and bridge, 1100 ft. long, in Pacific County over the Palix River.

## Irrigation Projects

**Calif., Susanville**—Contract for construction work on the Red Rock irrigation district reservoirs and distributing systems near Ravendale has been let to P. J. Hopper, of Susanville, contractor. The system will furnish water for 23,515 acres of land. The storage system is composed of three reservoirs. The distributing system provides a direct supply of water for every user. Thomas H. Means has been engaged as consulting engineer on the project.

**Wash., Walla Walla**—Dr. J. W. Summers, representative of the fourth congressional district, and Harry Phelps, manager of the Burbank irrigation district, have received telegrams from O. C. Merrill, executive secretary of the federal power commission, which will permit the immediate construction of the wing dam on the north bank of the Snake river, for which land owners of the district have strived for several years. Construction will begin as soon as the river recedes. The dam will be in operation this year.

**Wash., Bellingham**—A bill providing for the reclamation of 3,400 acres of tidelands along the western shore of the Lummi Indian Reservation by the construction of two dykes, one to cost $1,000,000 and the other $50,000 is being prepared by Government and Whatcom County officials. The bill will be submitted to Congress by Representative Lin Hadley. Plans include leasing the reclaimed land to white settlers.

## Power Plant Equipment

**Calif., San Francisco**—A large electric power plant is to be erected in the heart of the financial district of San Francisco, according to an announcement by the Pacific Gas & Electric Company. This plant, which is to be designated as substation "J" will eventually contain eight 2,600-kw. rotary converters, by means of which the electric light and power demand for that section of the city will be amply supplied.

## Railways

**Calif., Los Angeles**—Double tracking of the Angeleno Heights portion of the Edgeware road line has been started by the Los Angeles Electric Railway and work on other extensions will start at once. This is a part of a $6,000,000 program of extensions and improvements planned by the street railway company.

**Calif., San Bernardino**—A. T. & S. F. Ry. has appropriated $840,000 for new structures and additions to the railroad shops and yards at San Bernardino. The work includes a new machine shop, tin shop, and pipe shop costing a

total of $740,000 and a turntable costing $100,000. Acting general manager W. K. Etter, A. G. Wells, vice-president, A. G. Armstrong, superintendent of shops and W. B. Storey, president, have been on the site looking over the yards.

**Mex., Tepic**—Utah Construction Co., 820 Phelan Bldg., San Francisco, was awarded contract May 15, by Southern Pacific of Mexico Ry., for grading and tunnel work of the 82-mile gap on the 110-mile right-of-way to be constructed between Tepic and LaQuemada. The contract involves construction of entire line with the exception of a 10-mile stretch immediately south of Tepic, awarded to Twohy Bros. of Phoenix, and a short piece from LaQuemada north of the mountains, awarded to another firm. Rail will be laid by the railroad company. The Utah Construction Co. contract involves moving over 3,000,000 yd. of earth and rock; the construction of 33 tunnels, approximately 26,000 lineal ft., and the erection of steel bridges involving 11,000,000 lb. steel. The total contract amounts to about $6,000,000. W. E. Wattis is president of the construction company.

**Wash., Seattle**—Grant Smith & Company, Seattle, and MacDonnell, Ltd., of Calgary, received the contract for grading 50 miles of the Canadian Pacific Railway in the Tuffnell Northwesterly branch. The work will cost between $200,000 and $225,000.

**Wash., Everett**—C. McDonough, superintendent of the Cascade Division of the Great Northern Railway, at Everett, announces that work costing more than $125,000 will be started at once. Work includes a new wood-working plant, at the Delta Yards in Everett; 7 miles of curve rail near Skykomish to be replaced with 130-lb. rails.

## Street Lighting

**Calif., South Pasadena**—Bids are being received by city trustees for constructing ornamental lighting system in Camden and Court Aves., involving ten No. 500 single light concrete posts, equal to that manufactured by the Cement Products Co., equipped with Novalux unit No. 8.

**Calif., Fresno**—City Engineer Wm. Stranahan has completed plans and protests will be heard June 14, for a lighting system on Van Ness Blvd., and other streets, under 1911 Act. The system will involve 99 ornamental electroliers.

**Calif., Los Angeles**—Bids are being received by Board of Public Works for constructing ornamental lighting systems in Western Ave., between Hollywood Blvd., and 50 ft., n. of Lexington Ave. Specifications on file at office of city electrician, 203 n. City Hall Annex.

**Calif., San Diego**—Southern Electrical Co., Third and E. Sts., submitted low bid to city council at $12,994 for installation of electric ornamental lighting system on Broadway, from 8th to 16th Streets, including 52 reinforced cement concrete lighting posts, underground conduits, electric wires, pipes, lamps, globes, sockets, etc.

**Calif., San Diego**—A. C. Rice, 1963 Santee St., Los Angeles, was awarded contract by city council at $8662 for installing lighting system in La Jolla.

## Streets and Sewers

**Ariz., Tucson**—City Council has voted to secure 355 additional acres for the city sewer farm. Total estimated cost of the disposal works $21,000. The farm will have a total acreage of 590 acres. It is probable that a bond issue will be voted to cover the sewage disposal system and the cost of constructing a new incinerator.

**Ariz., Tucson**—Resolution of intention No. 776, adopted by city council May 7, for improving Sixth St., between Stone and Park Avenues, by grading and paving, constructing curbs, walks, gutters. Competitive bids will be asked for on 1½-in. Warrenite-bithulitic on 2½-in. bituminum base; 1½-in. asphalt type Willite surface on 2½-in. bituminum base; or 5-in. cement concrete. L. O. Cowan, city clerk.

**Calif., Long Beach**—City Engineer A. L. Ferver has completed plans for the construction of a 24-in. sewer in Broadway Alley, E. American Avenue, and Ocean Park Avenue, to carry the overhead in the business section. Estimated cost, $30,000. Plans will be presented to the City Council shortly.

**Calif., Riverside**—H. D. Churchill & Co., 350 Merrick Street, Los Angeles, have signed contract for construction of approximately 11 miles of sewer work, awarded some time ago. The work totals about $117,000 and will take about six months.

**Calif., Hollister**—Bonds in the sum of $48,000 to construct a septic tank and filter beds across the San Benito River and to make much needed improvements within the city carried at a recent election.

**Calif., Whittier**—Harvey N. Hanawalt was awarded contract for installing of a portion of the big outfall sewer. Cost, $48,000.

**Calif., San Bernardino**—City Engineer C. E. Johnson states that plans for the proposed deep sewer for Third Street and E. Street, will be ready in about a month. This sewer will permit the draining of basements and sub-basements and will make possible the erection of class "A" structures.

**Calif., Los Angeles**—Bids will be called for shortly by the Board of Public Works for the construction of four sections of the sewer system to connect Sawtelle or West Los Angeles district with the main city outfall. This work will be done under the $12,000,000 bond issue of which bonds to the amount of $2,000,000 have been sold to Blair & Co., funds from which will be used in the various preliminary parts of the projected sewer system for greater Los Angeles.

**Colo., Denver**—Monohan & Cunningham have been awarded contract for the layout of South Denver Improvement District No. 16 on a bid of $82,999.50.

**Ore., Astoria**—The Astoria city commission at a special meeting this morning awarded a contract to the John Slotte Company of this city for the rebuilding of the streets in the devastated district of the city. The commission also approved the recommendation of City Manager Kratz and Commissioner Skyles by adopting the chair or stepdown type of wall. The bid for this was $282,798.20, or about $12,000 less than the bid for a straight wall. Work is to completed within 90 days.

**Wash., Burlington**—Contract for paving and graveling of the residential districts has been let to Norris Bros., Mt. Vernon, Wash., on their bid of $39,473.80. Contract provides a 6-in concrete pavement.

**Wash., Tacoma**—Contract for resurfacing North Yakima Avenue, Division to 13th Street, has been let to C. E. Torkelson, Tacoma, for $39,500 providing for bithulitic surface.

**Wash., Aberdeen**—Contract for paving of Alder Street awarded to Haukeli, Hegg & Co., on their bid of $29,980.50.

**Wash., Tacoma**—City Engineer J. C. Manley is working out a plan for the construction of a large sewer conduit in the Gallagher Gulch District which will eventually form the outfall for all the storm and sanitary sewers of the southern end of the city. The work is estimated to cost $75,000.

**Wash., Seattle**—Contract for the installation of sewers in 62nd Avenue South has been awarded to Felix Arcorace & Company, of Seattle, on their bid of $98,974 for clay pipe. Work involves about 26,000 ft. of pipe, 8 to 27 in.

**Wash., Chehalis**—Contract for paving State Street, etal awarded to Albers Construction Co., Chehalis, at $19,177.

**Wash., Raymond**—Contract for paving First Street has been awarded to R. L. Rowland, Seattle, on a bid of $32,268.79 for 8-in. concrete paving.

**Wash., Seattle**—Improvements on streets, sewers and bridges, and repairs to damages resulting from slides, estimated to cost more than $700,000, will be necessary for the next twelve months in Seattle, according to reports of street and engineering departments. The largest item is the proposed bulkheading of Harbor Avenue Southwest and Alki Avenue, to cost $100,000.

## Waterworks

**Ariz., Flagstaff**—Flagstaff will utilize additional springs in the San Francisco mountains by the completion of a dam on Banning Creek, creating a 22-acre reservoir holding 110,000,000 gal. of water.

**Ariz., Tucson**—Improvements are proposed embracing the construction of a large reservoir providing the city with a gravity water system, the extension of city mains to sections of the city now without water, etc. It is estimated that a bond issue of a million and a quarter dollars would be sufficient to cover these plans, including the sewer farm extension, the construction of the proposed incinerator, the building of a storm sewer in the arroyo between Fourth Avenue and Stone, according to a talk which City Engineer G. H. Atchley made before the Kiwanians.

**Calif., Santa Barbara**—Montecito water board has received approval of the proceedings for the $800,000 bond issue from O'Melveny, Milliken, Tuller & McNeil. Leeds & Barnard, Central Bldg., Los Angeles, have been engaged as consulting engineers on the project, and are now at work on detailed plans for the water tunnel to be constructed in Toro Canyon.

**Calif., Belvedere**—Belvedere Water Corporation which has been organized to take over the property and service of the Belvedere Water Company, serving the Belvedere district east of Los Angeles city limits, has applied to the California State Railroad Commission for authority to transfer and to issue $300,000 first mortgage bonds to pay for same and to make necessary additions, improvements and betterments to its system.

**Calif., San Bernardino**—City Council is discussing a bond election to vote an issue of $80,000, for the purpose of providing funds to bring the Devil Canyon waters to the city. It would involve drilling two wells and necessary reservoirs. F. C. Finkle, hydraulic engineer and C. E. Johnson, city engineer.

**Calif., San Diego**—Bids will be called for shortly for the construction of a wood stave pipe line from Lower Otay reservoir to Bonita. Plans and specifications prepared by H. N. Savage, hydraulic engineer. The work will be done under the recent $450,000 bond issue. The pipe line is planned to give the city an additional carrying capacity from the impounding to the water distributing system.

**Calif., Los Angeles**—Mexican Petroleum Company has been granted a franchise to build 28 miles of pipe line from Santa Fe Springs to the coast. The company contemplates the construction of refineries, storage farms, and pumping stations, totaling about $15,000,000. The pipe line referred to will cost $150,000.

**Wash., Davenport**—Bids will be received until June 27 by the City Council for supplying materials and labor required in constructing additions to Davenport water supply system. Work includes a 150,000-gal. elevated water tank, laying 900 ft. of 8-in. main; changes in piping system at pump house.

*No. 3*

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*Electrical Merchandising*

*American Machinist*

*Industrial Engineer* (Published in Chicago)

*Engineering and Mining Journal-Press*

*American Machinist* European Edition (London)

# THE GROWTH OF INDUSTRY

BEHIND the work of the world's millions is the fabric of the world's industrial equipment. Into this fabric is woven the design of modern life.

¶ Vast, powerful and interdependent is this living industrial age. In little more than half a century science has transformed our globe of land and water into one gigantic institution.

¶ This colossal ball whirling through space, which geographers once separated into hemispheres, and which governments and languages divided into nations, industry has united through service to meet human needs.

¶ Where the discoverer once carried a flag and for the first time left an imprint of the foot of man, industry now delivers its wares for the preservation, comfort and refinement of life.

¶ Commerce knows no nationality and industry speaks all languages. Where man is, there is a market.

¶ While population has multiplied, sending overflowing peoples to cover trackless reaches of wilderness, the genius of the engineer has developed transportation, communication and production, so that all men may claim the right to live and progress.

¶ From the day of the isolated craftsman to this day of massed industry, the engineer has made possible an advance which cannot be reckoned because there has been no similar advance comparable with it.

¶ Of all the divisions of human effort there is none which may challenge the supremacy of the engineer, or show growth of like importance to human life.

¶ In the development of physical property, in capital investment, in labor employment, in scientific improvement of working conditions and equipment, in the advancement of product, in the accuracy of executive control, and in the service of the whole world of consumption, throughout the course of man's activities there has been manifest the trained mind of the engineer.

¶ The growth of industry is proof of the service of the engineer.

*Power*

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*Journal of Electricity and Western Industry* (San Francisco)

McGRAW-HILL COMPANY · INC ·

NEW YORK

PORTRAIT OF J. DALTON BY JOHN LONSDALE

# The Quaker *who made* Chemistry a Science

CAVENDISH had shown that two volumes of hydrogen and one of oxygen always combine completely to form water and nothing else. Proust, a Frenchman, had proved that natural and artificial carbonates of copper are always constant in composition.

"There must be some law in this," reasoned Dalton (1766-1844), the Quaker mathematician and school teacher. That law he proceeded to discover by weighing and measuring. He found that each element has a combining weight of its own. To explain this, he evolved his atomic theory — the atoms of each element are all alike in size and weight; hence a combination can occur only in definite proportions.

Dalton's theory was published in 1808. In that same year, Napoleon made his brother, Joseph, king of Spain. This was considered a political event of tremendous importance. But Joseph left no lasting impression, while Dalton, by his discovery, elevated chemistry from a mass of unclassified observations and recipes into a science.

Modern scientists have gone beyond Dalton. They have found the atom to be composed of electrons, minute electrical particles. In the Research Laboratories of the General Electric Company much has been done to make this theory practically applicable so that chemists can actually predict the physical, chemical and electrical properties of compounds yet undiscovered.

In a world of fleeting events the spirit of science and research endures.

General Electric
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95-606-MD

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*American Machinist* European Edition (London)

# THE BREADTH OF ECONOMICS

AN old word with a new meaning has been introduced into the affairs of men. The power of words is very great and an understanding of them is one of the essentials to progress.

¶ The advancement of humanity hinges, to an almost menacing extent, upon a complete conception of the word *economics*. Once popularly confined to finance, it has grown to involve the whole realm of human activity.

¶ Now man is the economic factor in the work of the world. Whatever he does, the result—time, effort, ability and resources engaged—must prove up under the standards of economics, or be judged unworthy.

¶ But who has brought about this change, this revision in the conception of man's advancement, of man's inevitable responsibility? And who has given this word so vast a power over human destinies and has caused so gigantic a revolution for the benefit of all humanity?

¶ The engineer. His is the responsibility. He it is who has introduced economics into all the affairs of men. He it is who has provided the world with a new basis for judgment and appreciation.

¶ The engineer, who has made life assume a scientific instead of a chaotic aspect; who has developed an exactness of procedure; who has worked out cause and effect on a calculable basis; who is even now reducing the fever of misapplication of life's priceless energies and putting them to the service of constructive happiness.

¶ It will be many generations before the mass of humanity knows and acknowledges its debt to the engineer, who so quietly brings about such stupendous revolutions and revelations, and who takes the past and links it to the present for the benefit of the future.

¶ Yet while the acknowledgment may be long in coming, the engineer has his reward in the knowledge of work well done, in the joy of accomplishment, in the feeling of power which gives him the opportunity to direct the courses of men even before they are aware of the source of authority.

*Power*

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McGRAW-HILL COMPANY · INC ·

NEW YORK

FROM GILBERT'S

DE MAGNETE —

# "WORD MONGERS" *and* "CHATTERING BARBERS"

"Word mongers" and "chattering barbers," Gilbert called those of his predecessors who asserted that a wound made by a magnetized needle was painless, that a magnet will attract silver, that the diamond will draw iron, that the magnet thirsts and dies in the absence of iron, that a magnet, pulverized and taken with sweetened water, will cure headaches and prevent fat.

Before Gilbert died in 1603, he had done much to explain magnetism and electricity through experiment. He found that by hammering iron held in a magnetic meridian it can be magnetized. He discovered that the compass needle is controlled by the earth's magnetism and that one magnet can remagnetize another that has lost its power. He noted the common electrical attraction of rubbed bodies, among them diamonds, as well as glass, crystals, and stones, and was the first to study electricity as a distinct force.

"Not in books, but in things themselves, look for knowledge," he shouted. This man helped to revolutionize methods of thinking—helped to make electricity what it has become. His fellow men were little concerned with him and his experiments. "Will Queen Elizabeth marry—and whom?" they were asking.

Elizabeth's flirtations mean little to us. Gilbert's method means much. It is the method that has made modern electricity what it has become, the method which enabled the Research Laboratories of the General Electric Company to discover new electrical principles now applied in transmitting power for hundreds of miles, in lighting homes electrically, in aiding physicians with the X-rays, in freeing civilization from drudgery.

**General Electric Company**

*General Office* *Schenectady, N.Y.*

95624 H. D.

*No. 5*

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# THE SAFETY OF INDUSTRY

SOME four centuries ago Leonardo da Vinci wrote a treatise on flying in which he endeavored, though not with entire correctness, to describe the mechanism of a bird's flight. It took the intervening centuries to make his theory a fact; and theory is valuable only when it becomes a fact.

¶ It is the irrefutability of basic facts which gives the modern engineer the leadership in many of our greatest and most essential undertakings.

¶ In his hands he holds the safety of this industrial age. Not merely its commercial stability, but the solution, as well, of many of our problems of government, of the revision of ethical principles, the defining of international agreements. From his statistical data will be gleaned much of the means for the social and material reconstruction of the world.

¶ The rise of the engineer as a leader in thought development has been rapid. It has come through proof of his ability to analyze, deduce and conclude; and then to put these findings into action, to express energy in terms of fact.

¶ An impressive proof of his leadership is his being found among the directors of many important financial, commercial and industrial corporations. And when an engineer speaks his associates give heed. For he does not surmise, he states facts; he does not offer conjecture or guesses, he submits statistical evidence.

¶ These newly risen leaders are the producers of facts, the originators of statistics, the developers of proofs. Theirs is the science of truth. They deal with absolutes, yet have no dogmas, for their absolutes are bases for operations, not limitations of practice.

¶ No new truth startles the engineer. He is able to see the combinations of circumstance which lead to the one and only possible conclusion which the new truth proclaims. The engineer gives the safety of certainty to industry.

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McGRAW-HILL COMPANY · INC ·
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# ROME WIRE

## "Super Service" Cord and Cable

**1** Rome Super Service Cord and Cable is new—new in construction—new in the service it renders—new in the terrific tests it withstands. Fit for the toughest job in every service where endurance counts.

**2** Fine stranded copper, effectively insulated and built up with cotton and rubber, over all a heavy layer of Super Service 60% rubber with embedded cords, vulcanized in steel molds under tons of pressure.

**3** Send for a sample, get a bit of it between your hands, feel that moulded-on name, try to break it, tear it, cut it—treat it to the most destructive tests you know—and know why we call it Super Service.

## So— *You Snip the Coupon— We Ship the Sample*

DON'T DO IT TO DAY — DO IT NOW !!!

TO THE ROME WIRE COMPANY, 161 RAILROAD STREET, ROME, NEW YORK
PLEASE SEND THAT SAMPLE OF ROME SUPER SERVICE PERSONALLY TO:

*Name:*_____ *Company:*_____

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*Check Kind Wanted*
- Super Service Cable ☐
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# WIRE-ROME

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# HUMAN ELASTICITY

THE greatest benefit nature bestowed upon man is his human elasticity, his incalculable capacity to withstand and to progress, his genius for making the most of life.

¶ In the head and heart of man are mixtures of wish and will which deny computation. Here lies our mightiest quality for advancement.

¶ Man knows no limitations. To him the impossible is constantly becoming the possible. While the majority may accept a situation as final for a time, there inevitably arises one who denies the false fate, and, carrying forward his belief in action, proves his faith, triumphs, and finds the world of doubters turned to applaud and to press forward.

¶ It is through this endurance, this unreckonable elasticity, that man achieves, and it is through this immeasurable fact that the engineer has become the first in the seats of the mighty-to-serve.

¶ Trained to deal with stress and strain, adapted by his very pride of calling to deny human limitations, he is forever putting the impossible to the test of science, and making it a reality.

¶ A dealer in facts, he turns dry tables and statistics into world-revolutionizing accomplishments. Life and action are the great romances of the engineer; his efforts become the enthralling dramas of industry, the thrilling victories of science, the glorious triumphs of commerce. Great need and great reward must inspire the average man to show his elasticity; but this talent is a part of the equipment of the engineer.

¶ Art, architecture, history, laws and ethics of each succeeding generation have carried forward the static records of the past into the ever-receding present. Industry, engineered action, has brought its living force, its organized energy, its directed and continuous purpose and its daily service constantly into the liquid and flowing present.

¶ This is the function, the essential service, of the engineer; this heroic task of making the whole past pay dividends to the present, for the greater good of the majority.

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McGRAW-HILL COMPANY · INC ·

NEW YORK

DAVY EXPERIMENTING WITH GARNETT IN THE ROYAL SOCIETY

# The First Electrochemist

NITROUS oxide, according to the science of a century ago, was "the principle of contagion when respired by animals in the minutest quantities." Mere say-so.

Imaginative yet skeptical Humphrey Davy, who believed in experiment rather than in opinion, "respired" it and lived.

It was this restless desire to test beliefs that made him one of the founders of modern science. Electricity was a new force a century ago. Davy used it to decompose potash, soda, and lime into potassium, sodium, and calcium, thus laying the foundations of electrochemistry. With a battery of two thousand plates he produced the first electric arc—harbinger of modern electric illumination and of the electric furnace.

Czar Alexander I and Napoleon met on a raft to sign the Treaty of Tilsit while Davy was revealing the effects of electricity on matter. "What is Europe?" said Alexander. "*We* are Europe."

The treaty was at that time an important political event, framed by two selfish monarchs for the sole purpose of furthering their personal interests. Contrast with it the unselfish efforts of Sir Humphrey Davy. His brilliant work has resulted in scores of practical applications of electrolysis in industry and a wealth of chemical knowledge that benefited not himself but the entire world.

In the Research Laboratories of the General Electric Company, for instance, much has been done to improve the electric furnace (a development of Davy's arc) and new compounds have been electrochemically produced, which make it easier to cast high-conductivity copper, to manufacture special tool steels, and to produce carbides for better arc lamps.

General Electric
*General Office* Company *Schenectady, N.Y.*

95-634D

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# THE VALUE OF CONCENTRATION

THE measurement of value of human achievement must include the capacity for concentration. No great undertaking has ever been completed without a control of this force.

¶ From the workman who knows the details of his routine, to the master who conceives and directs a vast enterprise, to the engineer who creates a new device, originates a better method, plans a scheme of operation, evolves a system of industrial evaluation, or solves a problem in economics, each in turn must command concentration in proportion to the true value of his accomplishment.

¶ The most difficult thing man has to learn is the science of concentration. It is also the most important quality for progress. The spark of genius is at some time struck within the consciousness of all men. Only those who possess or have developed the power of concentration are able to retain this spark and make it become a refining and creative flame. Here is the one common characteristic of all great artists, statesmen, masters of industry and engineers.

¶ In the case of the engineer, the study and practice of concentration is an essential feature of his advancement in his profession, a distinct feature of his training. He must be able to muster all his mental forces in perfect order and obedience.

¶ It is this capacity for concentration that has made it possible for the engineer to lay down the course man must follow if he would progress. And it is this course of which our present state of impatient indecision is in so great need.

¶ Until we accept the practical conclusions of the engineer our future will be handicapped by chance. Until we keep faith with his expressed principles of economics, the principles of fair return for fair effort, and of effort based on the science of service, our means and aims of life will be cheap and unprofitable.

¶ The day for hazards of half-formed schemes has passed. If we would go forward we must follow the established course laid out by the engineer.

*Coal Age*

*Electrical World*

*Electrical Merchandising*

*American Machinist*

*Industrial Engineer* (Published in Chicago)

*Engineering and Mining Journal-Press*

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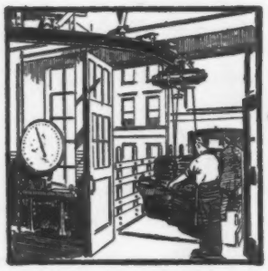
*Chemical and Metallurgical Engineering*

*Journal of Electricity and Western Industry* (San Francisco)

McGRAW-HILL COMPANY · INC ·

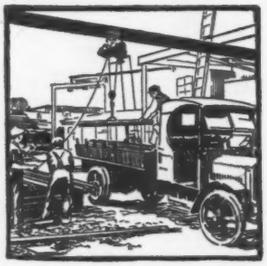
NEW YORK



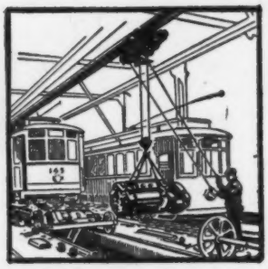
SHEPARD
ELECTRIC CRANES & HOISTS

# "Loads lifted and moved at remarkably low cost"

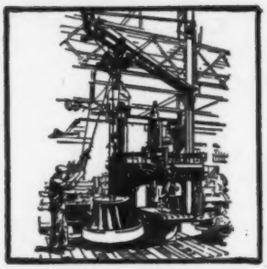
BRIEFLY, this headline tells why practically every industry is using this powerful little electric hoist—the *LiftAbout*. For this same reason, you should be interested.



*Low Cost* refers both to the *LiftAbout* method for moving loads, and to the price of the hoist. The *FIRST SAVING* is brought about by releasing men for more productive activities, and by accomplishing in far less time and cost the work formerly done by them. The *SECOND SAVING* is due to standardized manufacture and quantity production, which makes *LiftAbout* prices remarkably low. It has the same features that have made "Shepards" the most widely used electric hoists in America.



We can cite case after case where a *LiftAbout* has paid for itself in a few months—often within a few weeks. *IT WILL SAVE FOR YOU.*



Many possible uses for this powerful little hoist are suggested by the installations pictured in the *LiftAbout* folder. *Mail the Coupon today for a Copy.*

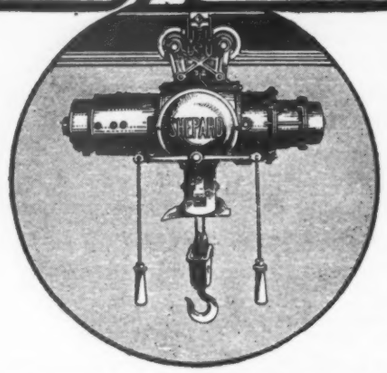
**SHEPARD ELECTRIC CRANE & HOIST CO.**

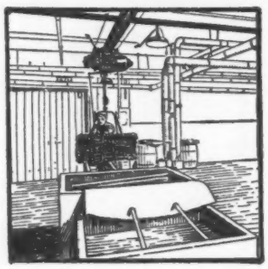
*Builders of electric cranes and hoists in capacities to 30 tons*

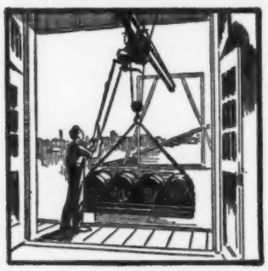
**460 Schuyler Avenue, Montour Falls, N.Y.**

*Branches in Principal Cities* Member Electric Hoist Mfrs.' Assn.

THE SHEPARD ELECTRIC
LIFT ABOUT





CLIP THE COUPON TODAY *for* THIS ILLUSTRATED FOLDER

Shepard Electric Crane & Hoist Company. 460 Schuyler Ave., Montour Falls, N. Y.
Send me a copy of the *LiftAbout* folder. No obligation incurred.

Name..... Address.....

City & State..... We Handle.....

*No. 8*

OF A SERIES OF ARTICLES PICTURING THE INFLUENCE OF THE ENGINEER IN THE AFFAIRS OF THE WORLD. PRESENTED BY THE McGRAW-HILL COMPANY, INC., WHOSE PUBLICATIONS HAVE SERVED THE ENGINEER THROUGH HALF A CENTURY OF INDUSTRIAL PROGRESS

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*Engineering and Mining Journal-Press*

*American Machinist* European Edition (London)

# THE SWAY OF INFLUENCE

THE institutions of the earth, like a set of ninepins, have been striking at each other in efforts to save themselves. This has come about through the balance of influence being on the destructive side, leading men into a succession of perils.

¶ Less than a decade ago the industries of our country had assumed the role of victors before circumstance had put them to the test. There followed an upheaval of our triumphant routine, when our gods of achievement were thrown down.

¶ We then became aware of the tragic fact that we had developed the mechanics of production, but not the science of economic production. We are now learning, at the cost of billions of wealth and years of hardship, that we have never known statistical accuracy and proved control.

¶ So the sway of influence has at last been directed toward constructive service. The swirl of thought and action, of effort without direction, has been given a check.

¶ This has come about through the increasing power of the engineer. By right of ability he has grasped the banner of influence from the clutch of chaos and has placed it above the stronghold of unified service. In so doing he has accepted the gigantic task of giving us service based on economics, prosperity secured by progress.

¶ From the designing of a labor-saving machine to the drafting of a sane law of international intercourse; from problems of education to the laying down of principles of ethics; from questions of transportation to questions of industrial management,—in all these the voice of the engineer is acquiring the influence of authority.

¶ It is the practical, the demonstrated ability of the engineer that has brought him this power of influence. His training in analysis, in creating the means and methods for elevating the activities of men, and his ability to detail, in exact and tangible manner, the complex answers to the problems of industrial life—these have fitted him for leadership.

*Power*

*Engineering News-Record*

*Bus Transportation*

*Electric Railway Journal*

*Ingenieria Internacional* (Printed in Spanish)

*Chemical and Metallurgical Engineering*

*Journal of Electricity and Western Industry* (San Francisco)

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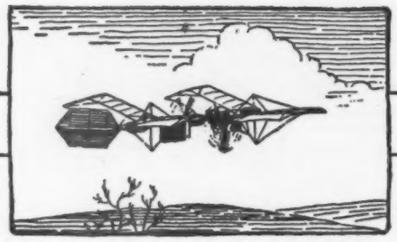
NEW YORK



LANGLEY'S FIRST MODEL IN FLIGHT

# "*The* way of an Eagle in the air"

CENTURY after century men broke their necks trying to fly. They had not troubled to discover what Solomon called "the way of an eagle in the air."

In 1891 came Samuel Pierpont Langley, secretary of the Smithsonian Institution. He wanted facts. His first step was to whirl flat surfaces in the air, to measure the air pressures required to sustain these surfaces in motion and to study the swirls and currents of the air itself. Finally, in 1896, he built a small steam-driven model which flew three-quarters of a mile.

With a Congressional appropriation of $50,000 Langley built a large man-carrying machine. Because it was improperly launched, it dropped into the Potomac River. Years later, Glenn Curtiss flew it at Hammondsport, New York.

Congress regarded Langley's attempt not as a scientific experiment but as a sad fiasco and refused to encourage him further. He died a disappointed man.

Langley's scientific study which ultimately gave us the airplane seemed unimportant in 1896. Whole newspaper pages were given up to the sixteen-to-one ratio of silver to gold.

"Sixteen-to-one" is dead politically. Thousands of airplanes cleave the air—airplanes built with the knowledge that Langley acquired.

In this work the Laboratories of the General Electric Company played their part. They aided in developing the "supercharger," whereby an engine may be supplied with the air that it needs for combustion at altitudes of four miles and more. Getting the facts first, the Langley method, made the achievement possible.

What is expedient or important today may be forgotten tomorrow. The spirit of scientific research and its achievements endure.

**General Electric Company**

*General Office* *Schenectady, N.Y.*

95-636D

*No. 9*

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# THE SENSE OF POWER

FULTON laboring with his steamboat, Whitney planning his cotton gin, Bell studying the bit of smoked paper which became the telephone,—all the noble army of engineers who toil for the good of humanity are conscious of a sense of power, a capacity for greatness.

¶ While these engineers may never fully comprehend the extent of their influence and strength to achieve, yet within them they feel the flow of understanding, the will to accomplish.

¶ It is this sense of power, which is even more a sense of responsibility, that has resulted in the development of a science of greatness. Genius need no longer be housed in a cellar or attic and meet with resistance and ridicule. There are adequate opportunities for its expression.

¶ The vast increase in population, the complexities of modern industrial life, the billions of capital investment, all call for the utmost of creative and analytical ability. We dare not risk the loss of brain-power.

¶ So our engineers, in order to insure the conservation of this mental force, have defined the channels of industry and established the economics of production, and in so doing have given the great minds of their profession reasonable means of expression for the benefit of humanity.

¶ It is to the engineer we owe the building up of the recognition of genius, and the putting of it on a defined scale of procedure. It is the engineer who has opened up paths of learning and made a recognized profession of the gigantic task of defining human activities and giving direction to energy.

¶ This systematic development of the sense of power has brought to the engineers an association of greatness, a cumulative capacity for accomplishment. And it is this combination of greatness which makes our engineers the leaders in economic service to the whole world.

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McGRAW-HILL COMPANY · INC ·

NEW YORK

# Express Service to England each *Wednesday*

The London Service of the United States Lines is a combination passenger and express freight service. It is maintained on a fast express schedule every Wednesday and places American shipments at their port of destination with a saving of time that brings the ports of loading and unloading nearer.

This London Service is a valuable servant of American Industry; a keen-edged tool for American Engineers. Each Wednesday, a swift, oil-burning American vessel is throbbing at the pier, awaiting the signal which will speed her on the way.

You are *sure* when you use this London Service. Your shipments are *safe* and carefully handled. They are unloaded *on time*. The new loading machinery on these vessels is a triumph of modern engineering. Recently 3500 bales of raw silk were unloaded from a ship of this type, reloaded on cars, and in 3 hours and 10 minutes the ship had resumed its trip.

For passengers, only one class of accommodations is available—with American Standards of comfort, cleanliness and luxury. Fares are as low as $120.

For full particulars—

## United States Lines, Operators for U.S. Shipping Board

45 Broadway, New York City

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# THE VITAL NEED— INFORMATION

THE merchant-traders of old Spain required a new route to India if their Indo-Spanish trade was to be saved. The situation was serious. A sailor, Columbus by name, set out to find this route. He failed, for he only found some wildernesses inhabited by savages.

¶ So far as helping Spain's commerce with India was concerned, the discovery of America was about as useful as the establishment of communication with Mars would now be helpful in clearing up our economic dislocation.

¶ Discovery and experimentation are essential to the advancement of industry; but they become of practical value only after they have been converted into proved and exact information. In its routine operations a business, or a nation, can only hope to secure or retain permanence of prosperity through following definite methods of procedure.

¶ Accurate information is the first principle in progress. When abnormal conditions incite to rash adventure in daily undertakings the result is invariably and inevitably costly.

¶ We have paid dearly for our top-heavy prosperity due to wartime excesses. Commerce threw over its ballast of defined information developed by the engineer in the mad belief that the temporary gain would be permanent.

¶ Commerce is still mourning its indiscretions; but it is returning to the exact methods of the engineer. Commerce is learning that only through adherence to such calculable conclusions can we be certain of again accomplishing sound prosperity.

¶ Now we know that experiment and chance can not take the place of accurate information. Industry, and the world at large, require facts for safety. It is the function of the engineer to supply these facts. It is his duty to create the means for economic procedure.


McGRAW-HILL COMPANY · INC ·

NEW YORK

ROBERT BOYLE'S

AIR ~ PUMP

# The "*PRACTICAL*" Alchemist *and* "*THEORETICAL*" Robert Boyle

THE alchemists wrote vaguely of "fluids" and "principles." Copper was potentially silver. Rid it of its red color and the "principle" of silver would assert itself, so that silver would remain. With a certain amount of philosopher's stone (itself a mysterious "principle") a base metal could be converted into a quantity of gold a million times as great.

This all sounded so "practical" that Kings listened credulously, but the only tangible result was that they were enriched with much bogus gold.

Scientific theorists like Robert Boyle (1627-1691) proved more "practical" by testing matter, discovering its composition and then drawing scientific conclusions that could thereafter be usefully and honestly applied. Alchemists conjectured and died; he experimented and lived.

Using the air pump Boyle undertook a "theoretical" but scientific experimental study of the atmosphere and discovered that it had a "spring" in it, or in other words that it could expand. He also established the connection between the boiling point of water and atmospheric pressure, a very "theoretical" discovery in his day but one which every steam engineer now applies.

He was the first to use the term "analysis" in the modern chemical sense, the first to define an element as a body which cannot be subdivided and from which compounds can be reconstituted.

Boyle's work has not ended. Today in the Research Laboratories of the General Electric Company it is being continued. Much light has there been shed on the chemical reactions that occur in a vessel in which a nearly perfect vacuum has been produced. One practical result of this work is the vacuum tube which plays an essential part in radio work and roentgenology.

General Electric Company

*General Office* *Schenectady, N.Y.*

95-625D

*No. 11*

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# THE NEED FOR STABILITY

OUR tormented world cries aloud for stability, for an established course of procedure toward a known objective.

¶ The way before us is unknown, nor can it ever be known until it is a part of the past. But we can establish a stability, the greatest possible stability, through an analysis of the lessons left us by the past, by the progress and chaos of former generations.

¶ Stability is confidence and courage. These come through knowledge of what to do and how to do it. This knowledge is the product of the engineer. His is the labor of exactness, of definite principles, of known quantities.

¶ It is the engineer who is able to picture tomorrow as a composite of the past, with all its influence, and of the future, with its hope and belief, its confidence and courage.

¶ He it is who combines the good of the past with the needs and desires of the present, and in so doing estimates the problems of tomorrow to a degree of preparedness.

¶ And tomorrow is the most vital thing facing this world. Nor has there been a tomorrow in history so vital as the one immediately before us.

¶ At last we are emerging from the tragedy of a series of disasters. The strength, the resources, the determination and the valor of the world have been tried by a consuming fire.

¶ Only the stabilizing force of the engineer has been able to bring us out of that period of speculative recklessness when we used destiny as a makeshift, and brought the world to a state of explosion.

¶ Tomorrow can be no non-committal time, and no one realizes this so fully as the engineer. It must carry us heroically and wisely forward, or drop us back into incalculable disaster.

¶ We have traveled enough on chance and wild promises. We must know our course. The establishment of this course is in the hands of the engineers. They have developed the science of life in both its industrial and social phases. They must bring us stability.

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NEW YORK

# Use IR Portable Compressors

## If We Only Had Compressed Air

You have said this many times while using hand methods for work which could have been done in a fraction of the time with air tools. However, the erection of a stationary air compressor plant and piping up might have cost more than the air tools could have saved—and the job was too short to take the trouble and spend the money.

An I-R Portable Compressor would have solved these problems. You could have rolled it up to the job, connected up the air tools and finished the work in a fraction of the time—and with about one-half the labor.

I-R Portable Compressors are complete, compact plants—gasoline engine (or electric motor) air receiver, cooling system and accessories.

Gasoline Engine Driven—91, 160, 210 cubic feet per minute capacity
Electric Motor Driven —91, 160, 250 cubic feet per minute capacity

*With Air Power as portable as the gang's tool box can you afford to work without it?*

*Many illustrated booklets tell the story of the Portable Air Compressor. Send for copies of Nos.* 3315, 1107, 1062, 1112 *and* 1015.

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# Ingersoll-Rand

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# THE ECONOMICS OF SHOCK

LATE in the summer of the year nineteen-fourteen this world received the first of a series of shocks such as man has never before experienced—save Golgotha.

¶ The shock of the cross is still felt today, but for several centuries its effect has been chiefly spiritual. The shock which first shook the earth eight years ago was chiefly commercial; but the recurring blows, of increasing force, struck awake the emotions, intelligences, interests and ambitions of all men.

¶ What the future result (there can be no final result) of these eight years of shocks will be, no one can foretell in detail. We already know they have changed the whole trend of human thought, so that popular beliefs of a decade ago appear now archaic and obsolete.

¶ The modern engineer has proved to us that the world can not turn back without extinction. It can not go on without a goal. A mental, moral and material relapse is not a fantastic illusion.

¶ The spirits of men are more at war today than ever during the recent years of battle. Yet the heart of man is sick of strife. He fights on because the great price already paid makes him rightly demand an adequate reward.

¶ His demand can be met in proportion as he recognizes the teachings of our engineers; those men who have established the fact that our interdependence of life requires a unity of effort based on an exact application of economic stability.

¶ Through the engineer's precise and tangible analyses of energies he has been able to formulate on a working plan the indivisibility of economic forces, the interrelationship of all activities, and so to give us a definite conception of the science of life.

¶ It is the duty of the engineer, as well as his opportunity, to produce progress out of shock. This stupendous undertaking he has accepted.

¶ Consequently, both our sense and our safety impel us to turn to the engineer to bring us back to economic sanity.

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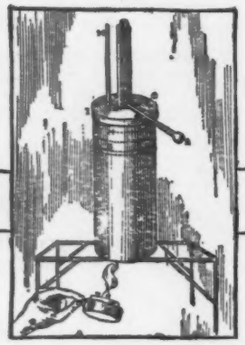
NEW YORK

DENIS PAPIN'S



STEAM CYLINDER

# They Weighed Air— *and* Charles II Laughed

SAMUEL PEPYS says in his diary that Charles II, for all his interest in the Royal Society, laughed uproariously at its members "for spending their time only in weighing of air and doing nothing else since they sat."

This helps to explain why Charles has come down to us as the "merry monarch."

The Royal Society was engaged in important research. It was trying to substitute facts for the meaningless phrase "nature abhors a vacuum," which had long served to explain why water rushes into a syringe—the commonest form of pump—when the piston is pulled out.

Denis Papin had as much to do as anyone with these laughable activities of the Royal Society. Papin turned up in London one day with a cylinder in which a piston could slide. He boiled water in the cylinder. The steam generated pushed the piston out. When the flame was removed, the steam condensed. A vacuum was formed and the weight of the outer air forced the unresisting piston in.

Out of these researches eventually came the steam engine.

London talked of the scandalous life that King Charles led, and paid scant attention to such physicists as Papin, whose work did so much to change the whole character of industry.

The study of air and air pumps has been continued in spite of Charles's laughter. In the General Electric Company's Research Laboratories, for instance, pumps have been developed which will exhaust all but the last ten-billionth of an atmosphere in a vessel.

This achievement marks the beginning of a new kind of chemistry—a chemistry that concerns itself with the effect of forces on matter in the absence of air, a chemistry that has already enriched the world with invaluable improvements in illumination, radio communication, and roentgenology.

General Electric Company

*General Office* *Schenectady, N.Y.*

95-632D

# A marvelous new washer— made with all the precision of high power firearms

AN entirely new type of washing machine — made by the Savage Arms Corporation.

These expert craftsmen have for twenty-five years been turning out guns and ammunition requiring the highest degree of mechanical skill and accuracy.

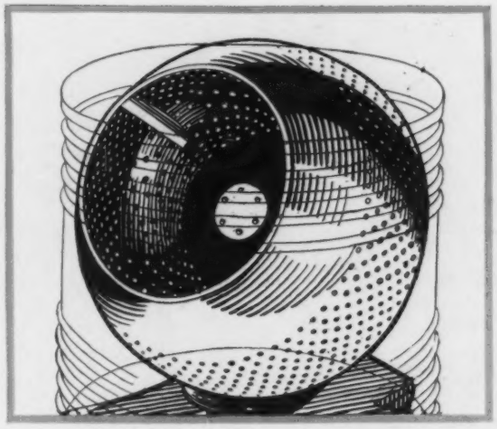
The same engineering skill, the same precision, the same methods of laboratory testing have been utilized in the making of this new washer — THE SAVAGE WASHER AND DRYER.

This means that the Savage Washer is as perfect as the most highly specialized engineering experts could make it. At the same time its construction is so simple that it is easy to operate, easy to care for, perfectly safe, and free from service.

**The washing machine with *all* the features women want**

**Washes—rinses—blues—dries—without removing clothes**

***Needs no wringer***



Spinner in washing position

HERE is a washing machine that washes, rinses, blues and dries the clothes without removing them from the tub.

Not only that—it is a washing machine of the type recommended by leading laundering experts. Never before has this combination been found in one machine.

The Savage Washer and Dryer contains fewer parts than any other washing machine and requires a minimum of service on the part of the dealer.

All operating parts of the machine run in a permanent oil bath, making oiling unnecessary.

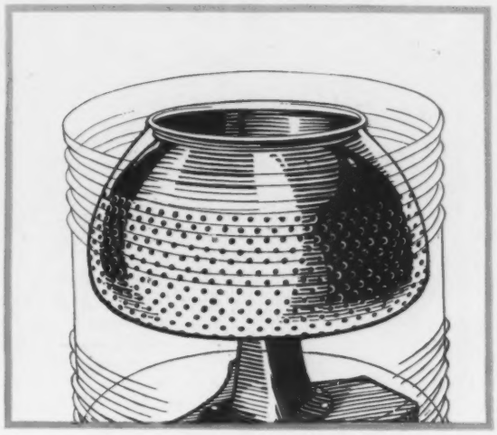
There is no wringer to cause serious accidents or get out of order. An easy motion shifts the spinner from the washing position to the drying position. The clothes are dried in the washer—line-dry in one minute, ready to iron in twelve minutes.

The Savage Washer and Dryer is equipped with a white enamel flat top so that it may be used as a table when not otherwise in use.

It is solidly built and comes in two models, one in solid copper, the other in heavy galvanized metal attractively finished in cream color with white top.

Dimensions: 36" high, and 26" in diameter.

The capacity of its washer is 10 pounds of dry clothes—about 7 double sheets or equivalent.



Spinner in drying position

The Savage Washer and Dryer combines all the desirable features of other washing machines.

There is nothing mysterious or complicated about the construction or washing operation for women to fear.

Our offer to the trade will appeal to you. It is one which it is distinctly to your advantage to learn more about.

Millions of women will have this machine brought to their attention by a campaign of national advertising.

The name of Savage for so long connected with a line of firearms famous for their accuracy and durability carries with it a guarantee of satisfaction.

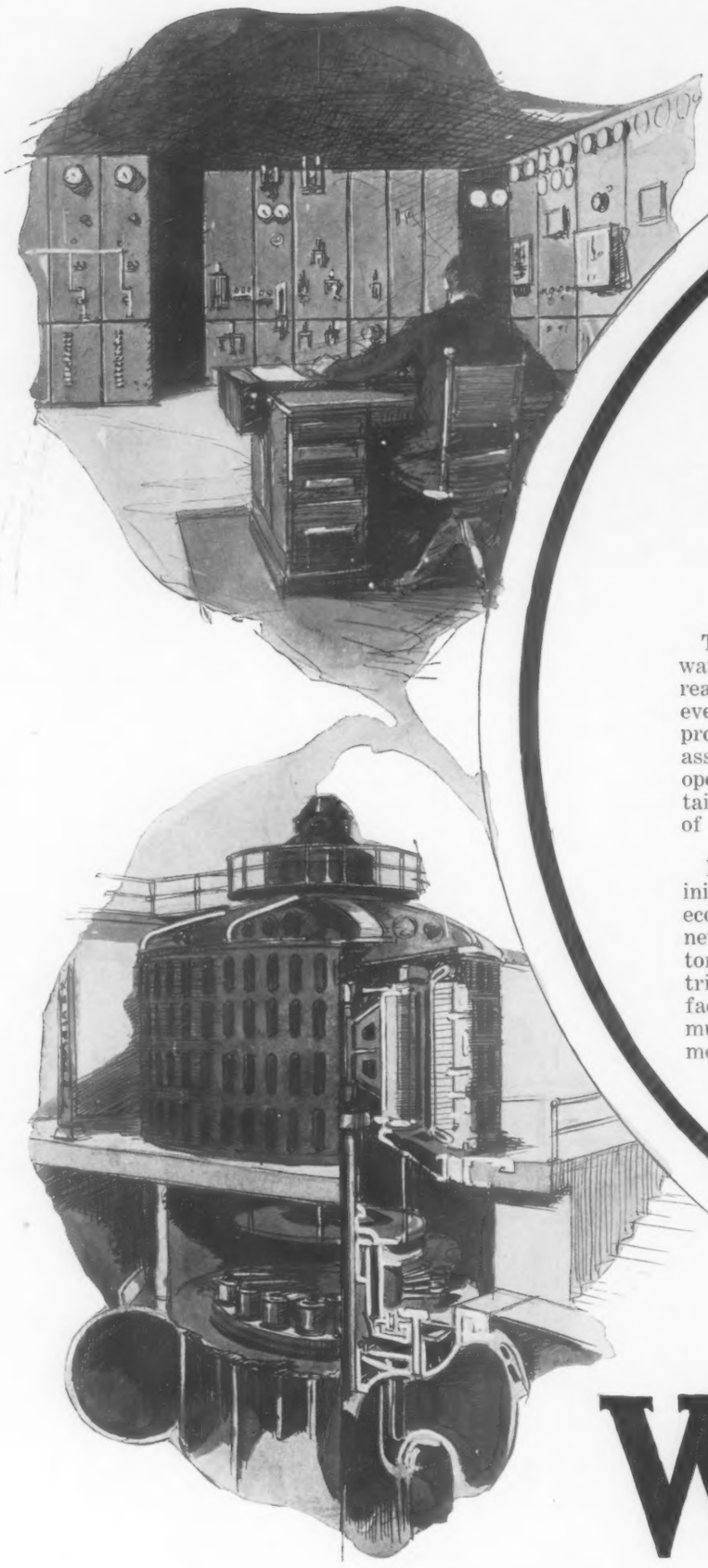
Write us at once for descriptive literature and full details of our selling proposition. Address Savage Arms Corporation, Dept. A3, Utica, New York.

# SAVAGE

## WASHER *and* DRYER

*The Savage Washer and Dryer is the first of a line of important household appliances to be brought out by the Savage Arms Corporation. An electric refrigerator of an entirely new type will be put on the market in the very near future.*

Westinghouse
Since 1849
The thought of the great gold rush, the prospector and his hardships, are immediately associated with the year 1849, and naturally enough.
But little did the hardy pioneer dream of the great western empire—our present civilization—for which he was to help lay a foundation. It was not for him to know that the mountains he crossed were some day to give mankind a far richer inheritance than gold itself. The rushing mountain streams were to him only an incident in the crossing of the mountains to reach the gold beyond. The value of water power was not dreamed of by him.
And so we follow the lines of progress in the West from 1849. The great influx of population brought with it the need for food, shelter and comforts and our early settlers made their beginnings in agriculture, manufacture and home building.
Now we are a great empire, still building from the first foundation, with a welcome for the world. But the incentive is not gold. It is the super-abundance of hydro-electric power, ready to serve in any way or in any capacity.
W
WESTINGHOUSE ELECTRIC



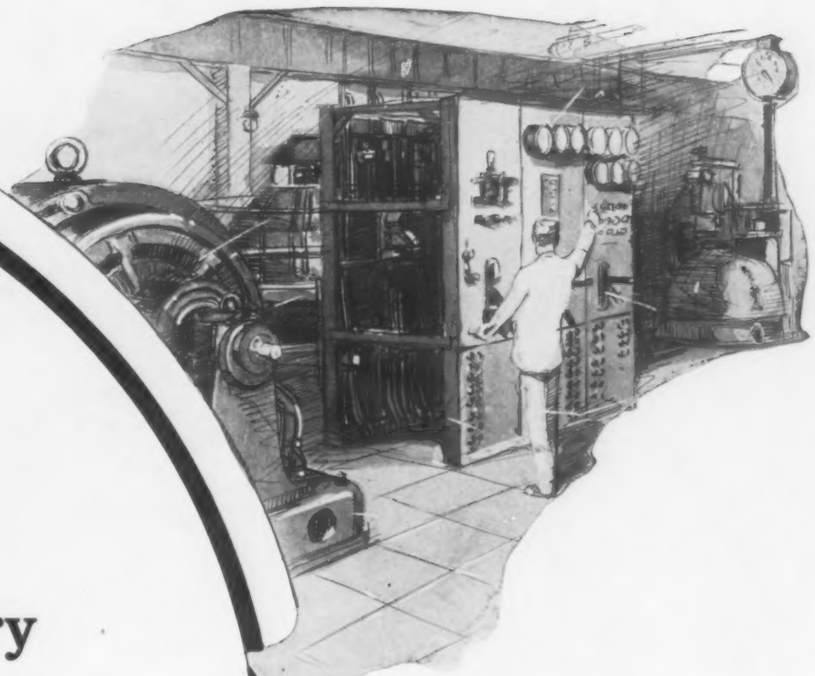
# More Than A Quarter A.C Development in Service Stands Ready to

The initial outlay for an installation of waterwheel generators and auxiliary units reaches a figure such that no mistake, however slight, can be allowed in the selection of proper equipment. There must be positive assurance that such equipment will not only operate according to their ratings, but maintain a high rate of efficiency over a period of years.

It is then the combined economy in cost of initial outlay, together with stable and economical operation which determines the net economy—result. This is one basic factor which regulates the cost of hydroelectricity to the consumer, consequently the factor which must be reduced to the minimum. Reliable generating equipment will do most to maintain low operating costs.

**Generator Experts Located in Every District Office**

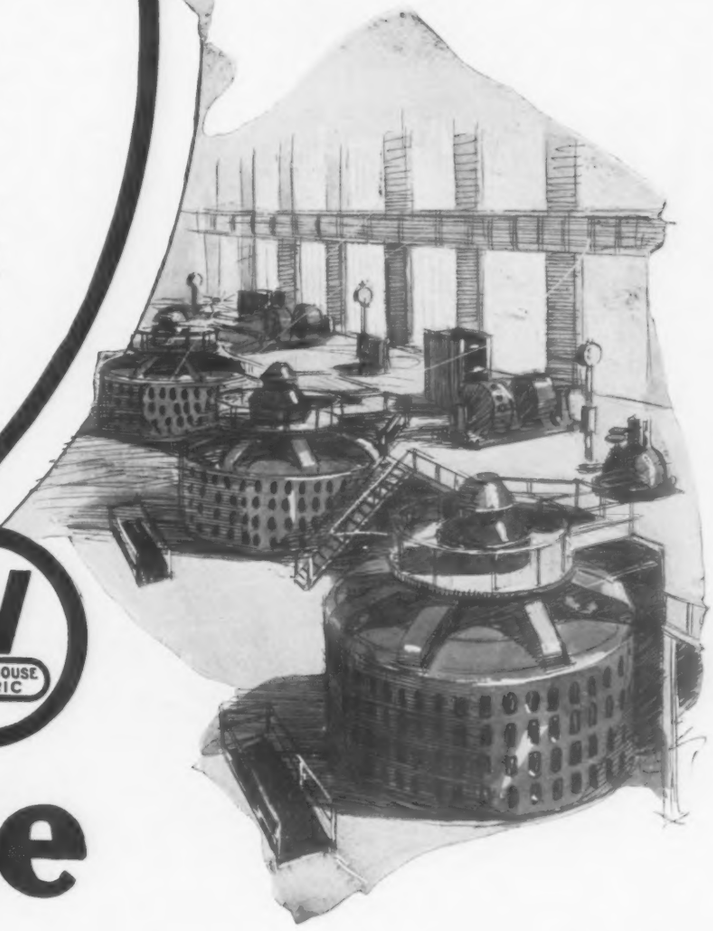
# Westin



# Than Century of A.C. Generators Serve the Industry

The Westinghouse Electric & Manufacturing Co. justifies its claim to leadership in engineering design and application through

— Engineering ability and experience to meet special and exacting needs.
— Manufacturing facilities and engineering versatility equal to any special conditions and requirements.
— Scientific construction.
— Research and testing laboratories to assure quality of materials.
— Manufacturer's reputation, integrity and financial responsibility.
— Service after installation to assure permanency of satisfaction, emergency helps, and assistance in influencing customers to buy power.



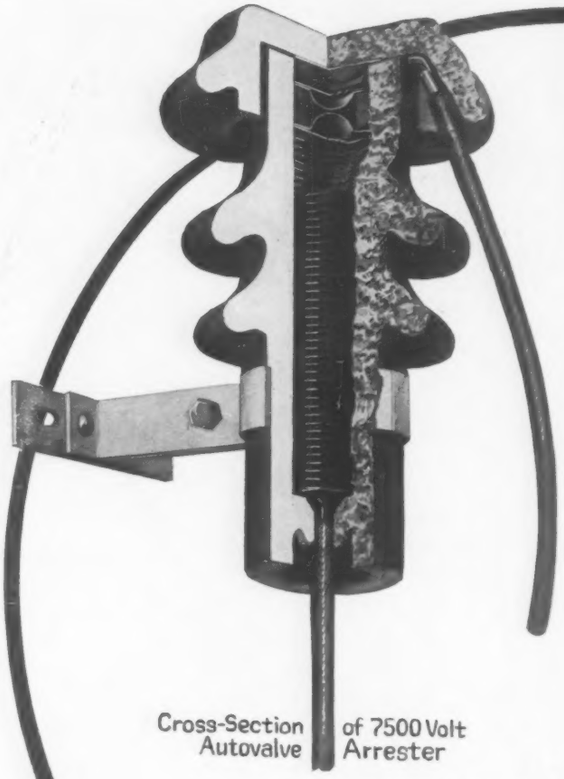
District Offices are located in the large western cities

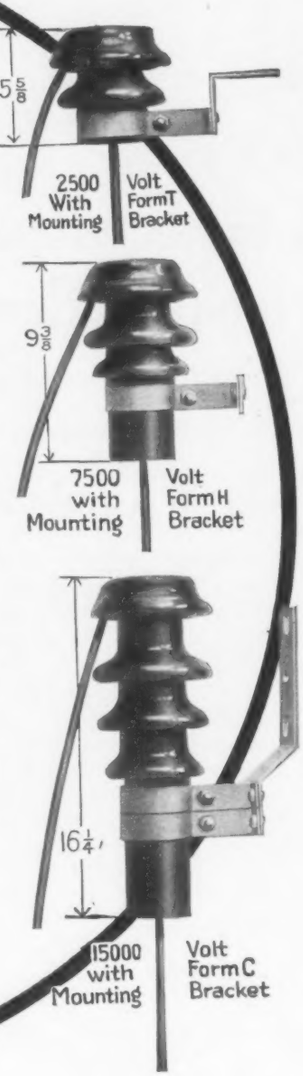
W
WESTINGHOUSE ELECTRIC

ghouse

# A New Arrester

## The Westinghouse Type LV Automatic Arrester for the Protection of Distribution Transformers




The Type LV Arrester, the first valve-type arrester ever offered for distribution service, is a marked advance in lighting protection.

These Arresters, besides giving a maximum of protection, meet all the requirements of distribution service on the score of installation and maintenance. Various kinds of mounting brackets are provided to suit installation conditions. The arrester may be turned in the bracket to bring the lead in any desired position. Furthermore, the Autovalve Arrester is free from the necessity of periodic attention, only very infrequent inspections being required.

They are made in three sizes, as illustrated, for 2500, 7500 and 15,000 volt maximum. The 7500 and the 15,000 volt sizes are also used, with a certain proportion of the active elements omitted, for 5,000-volt and 12,000-volt applications respectively.

**Ask for descriptive leaflet DL-20013**

**Westinghouse Electric & Manufacturing Co.**
**East Pittsburgh, Pa.**

# Westinghouse

# Insulator Satisfaction is Proved Through the Repeat Order

One very practical and convincing way of expressing confidence and satisfaction in a product is to place a repeat order. And that's just what has taken place in Southern California. A repeat order for 50,000 Westinghouse Suspension Insulators has been placed by the Southern California Edison Company, this material to be used in the extensive development work being carried on by that company.

Such an unmistakable sign of approval does a great deal more than merely please the supplier. It gives a large measure of incentive and inspiration to those whose entire time and energy are spent in the development and perfection of high-tension insulators. And coming as it does from the West, the place of undisputed leadership in electric development, the encouragement is that much greater.

The most modern experimental laboratory, the greatest refinements in manufacturing and the best engineers procurable are the factors which stand with the Westinghouse guarantee back of every porcelain insulator shipped from our stocks.

The illustrations show (right) a type of suspension insulator and (left) a suspension strain insulator.

Each suspension strain insulator unit is rated at 11,000 volts and weighs approximately nine pounds.

**Westinghouse Electric & Manufacturing Co.**
Agent for Westinghouse High-Voltage Insulator Co.
(Successors to Pittsburg High-Voltage Insulator Co.)
General Office and Works, Derry, Pa.

# Westinghouse

# Insulating Materials

A supply of dependable insulating materials is indispensable to the central station and it is of the greatest importance that the quality be of one grade—the best.

Westinghouse research engineers have spent more than thirty years in the development of insulating materials, with constant thought of the part they play in the successful operation of electrical equipment. The products of their study have satisfactorily met the requirements of Westinghouse products just as they will meet the requirements of any apparatus in which the best insulation is essential.

Insulating materials, identical with those used so successfully in Westinghouse products, are available to the industry in handy containers, ready for instant use. And moreover, a Westinghouse engineer is immediately available to help in the solution of any insulating problem that may arise.

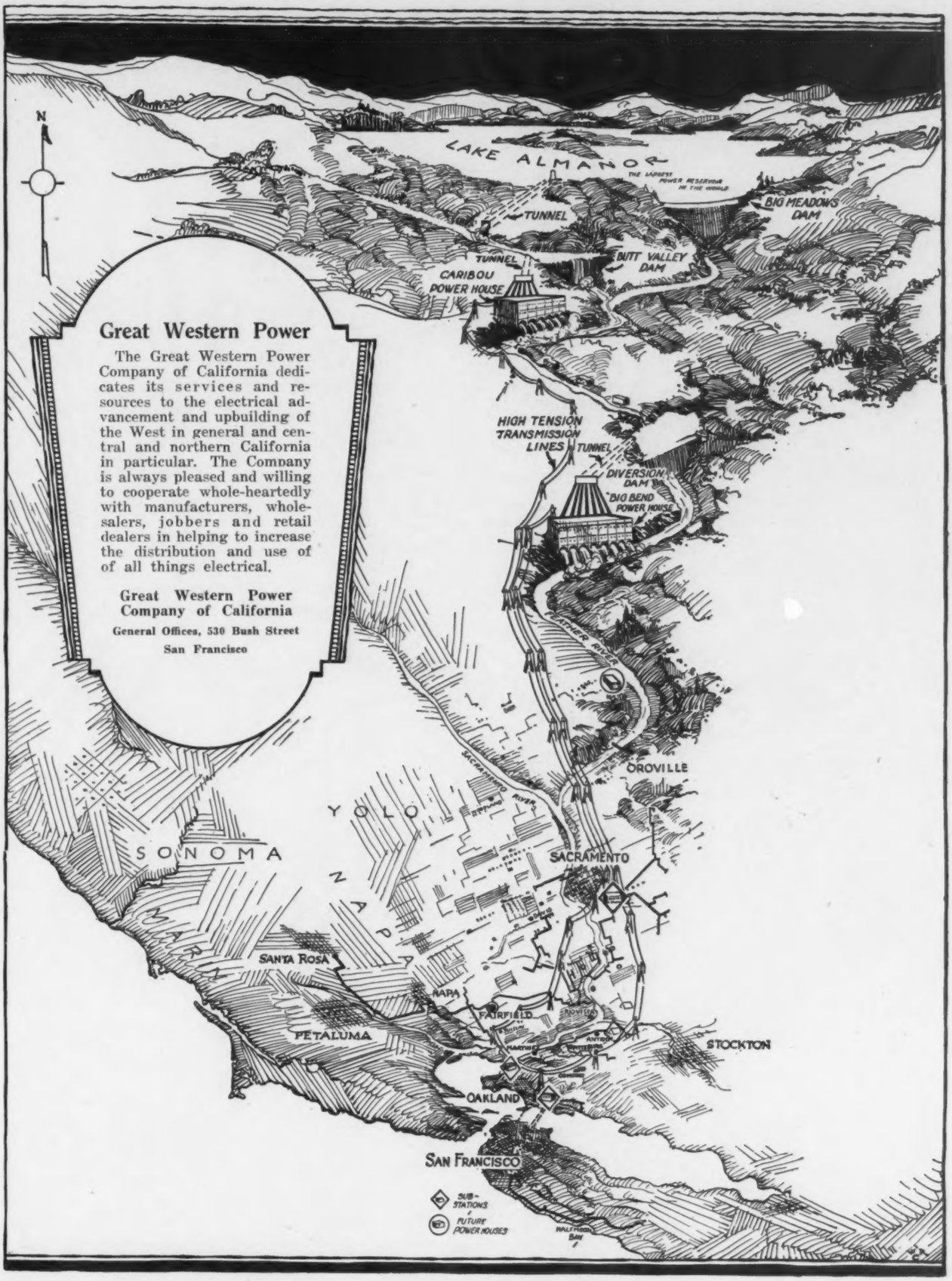
Get any needed assistance from our District offices.

List below gives the location of the house nearest you.

**Westinghouse Electric & Manufacturing Company**
East Pittsburgh, Pa.

San Francisco, 1 Montgomery St.
Seattle, Second and Cherry Sts.
Spokane, 821 Old National Bank Bldg.
Portland, Broadway and Morrison Sts.
Salt Lake City, 2nd South and Main Sts.
Butte, 52 East Broadway
Denver, 910 Fifteenth St.
Los Angeles, 7th and Spring Sts.
Tacoma, 615 Rust Bldg.

# Westinghouse


N
LAKE ALMANOR
THE LARGEST POWER RESERVOIR IN THE WORLD
TUNNEL
BIG MEADOWS DAM
TUNNEL
BUTT VALLEY DAM
CARIBOU POWER HOUSE
Great Western Power
The Great Western Power Company of California dedicates its services and resources to the electrical advancement and upbuilding of the West in general and central and northern California in particular. The Company is always pleased and willing to cooperate whole-heartedly with manufacturers, wholesalers, jobbers and retail dealers in helping to increase the distribution and use of of all things electrical.
Great Western Power Company of California
General Offices, 530 Bush Street
San Francisco
HIGH TENSION TRANSMISSION LINES
TUNNEL
DIVERSION DAM
BIG BEND POWER HOUSE
FEATHER RIVER
OROVILLE
SACRAMENTO RIVER
YOLO
SONOMA
NAPA
MARIN
SACRAMENTO
SANTA ROSA
NAPA
FAIRFIELD
PETALUMA
STOCKTON
OAKLAND
SAN FRANCISCO
SUB-STATIONS
FUTURE POWER HOUSES
HALF MOON BAY

# Growing up with Los Angeles

**From barley field to city block**

**Stanley Avenue, Hollywood, today**
*(North from Melrose Avenue)*

**and as it looked one year ago**
*(Pole lines on tract; street work being done)*

¶ Los Angeles Gas and Electric Corporation serves this section with both gas and electricity.

## Los Angeles Gas and Electric Corporation

# Labor Costs are Less *when Power is Purchased*

BETWEEN the wages of a mechanic who can keep power generating machinery in operation and the wages of a man who can throw a switch, there is a great difference.

Before installing a power plant, figure this difference out with a P G & E representative. See how much can be saved in labor *alone* through "PACIFIC SERVICE."

PACIFIC GAS AND ELECTRIC COMPANY
GENERAL OFFICES: 445 SUTTER STREET, SAN FRANCISCO

PACIFIC GAS AND ELECTRIC COMPANY — PACIFIC COURTEOUS CONTINUOUS SERVICE

**P · G · and E ·**

**"PACIFIC SERVICE"**

30-623

# Operated Under the Direction of the Byllesby Engineering and Management Corporation

**San Diego Consolidated Gas and Electric Company**

Serving San Diego and vicinity

Number of Customers Served Electric and Gas

| | |
|---|---|
| 1923 | 70,250 |
| 1905 | 3,250 |
| Gain | 67,000 |

Population per Electric Meter

| | |
|---|---|
| 1923 | 3.9 |
| 1905 | 20.9 |

**Western States Gas and Electric Company**

Serving Stockton, Richmond, Eureka, and vicinities

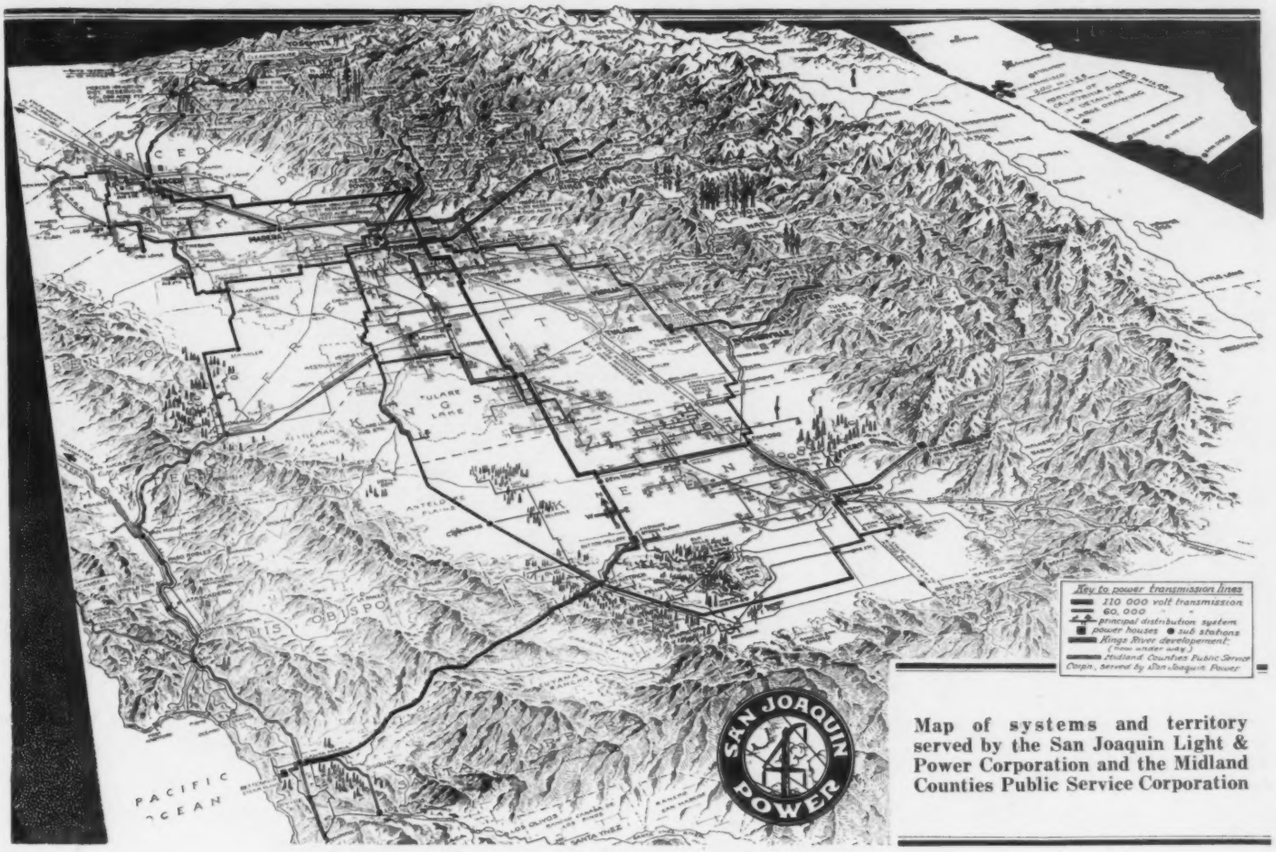
Number of Customers Served Electric and Gas

| | |
|---|---|
| 1923 | 44,350 |
| 1911 | 16,300 |
| Gain | 28,050 |

Population per Electric Meter

| | |
|---|---|
| 1923 | 3.5 |
| 1910 | 5.7 |


# Operated Under the Direction of the Byllesby Engineering and Management Corporation




**Map of systems and territory served by the San Joaquin Light & Power Corporation and the Midland Counties Public Service Corporation**

# Like a Magic Carpet

ACROSS the flat San Joaquin Valley plains that once were a semi-arid waste, Agriculture is steadily unrolling its magic green carpet of orchard, vineyard, and alfalfa field.

And in and out of the carpet, warp and woof of its fabric, run the power lines of the San Joaquin Light and Power Corporation.

**A request will bring an enlargement (16 x 22 inches), of the above map. Address San Joaquin Light & Power Corporation, Fresno, Calif.**

The San Joaquin Light & Power Corporation covers approximately 6,000,000 acres in seven counties in the San Joaquin Valley, of which less than 1,800,000 acres are under cultivation. In the above map are shown 5,500 miles of transmission and distribution lines, 11 water power plants and three steam plants, having an installed capacity of 182,533 horsepower in 1922.

The Midland Counties Public Service Corporation, serving in Fresno, Monterey, San Luis Obispo, and Santa Barbara Counties, receives all its power wholesale from the San Joaquin Light & Power Corporation.

## San Joaquin Light and Power Corporation

**Fresno, California**

# *When Oliver Asks for More---*

**Every day hundreds of "Olivers" are coming to California — to live — to work — to invest. Individually, he may be a manufacturer demanding a thousand horsepower in motors. He may be a farmer needing power for irrigation. He may be a merchant requiring elaborate and extensive illumination. In any case, he must have a home with all electrical facilities. And his demand is as insistent as that of Oliver Twist for more porridge.**

HOMES

This Company will serve more than 30,000 new homes in 1923. The building permits in the territory served for the current year will approximate two hundred million dollars.

INDUSTRY AND IRRIGATION

New factories coming to Southern and Central California in 1923 will require 40,000 horsepower in electric service and the additional demand for operating pumping plants will require 20,000 electric horsepower.

TRANSPORTATION

Edison power now supplies over 2000 miles of electric railways. Every new citizen demands his quota of power for transportation, both passenger and freight, and indications point to the electrification of some divisions of steam roads in the near future.

***It is the obligation of the Public Utility to keep pace with the demand for service.***

This can be done only by a vigorous program based on a knowledge of the past and confidence in the future. These figures show why we must build large plants to keep a little ahead of coming requirements.

**Kilowatt-hours Production**

| | |
|---|---|
| **1921** | **1,079,000,000** |
| **1922** | **1,199,000,000** |
| **1923*** | **1,320,000,000** |

*Estimated for remainder of year.

**In 1921, two new plants totalling 92,000 horsepower were put into commission. This large amount of power was absorbed during 1922. During 1923, further additions to the generation system will increase production resources by 125,000 horsepower. Parallel with these expansions it is necessary to make extensive additions to the transmission and distribution systems. The budget for 1923 calls for total expenditures of $26,000,000.00**

# SOUTHERN CALIFORNIA EDISON COMPANY

# A Growing Company

## *Serving a Growing Community*

A territory rich in natural resources coupled with adequate power service presents unlimited possibilities for development. However rich the native resources may be, without adequate power service, full development would be handicapped. Monterey County, in which is located the Salinas Valley, is rich in agricultural resources. It is served by the Coast Valleys Gas & Electric Company which is playing an important part in the development of the territory.

The Coast Valleys Gas & Electric Company, by supplying power for irrigation, is contributing to the development of dairying, truck farming, growing of beets, sweet peas, berries, including the Oak Grove Berry Farm, largest strawberry acreage in the world, alfalfa hay, grain, barley, pears, almonds and other farm crops. Besides agriculture, power is supplied to the Spreckels Sugar Company, the Nestles Food Company, the Meyenberg Evaporated Milk Company, numerous Fish Canneries on the Monterey Bay, and the New Idria Quicksilver Mines.

As the territory grows the Coast Valleys Company also grows and as the Company develops the territory will also develop. That both the territory and the Company are growing is proved by the facts as shown on the Power Company's books.

**The following is a summary of the Company's progress during 1922:**

| | | Increase Over 1921 |
|---|---|---|
| Fixed Tangible Capital (As of December 31, 1922) | $1,975,601.00 | $226,032.33 |
| Gross Operating Earnings (During 1922) | 661,256.38 | 41,417.66 |
| Net Income (During 1922) | 72,692.27 | 9,491.41 |
| Energy Sold During 1922 | 14,626,112 KWH. | |

## Coast Valleys Gas & Electric Co.

**General Offices: Salinas, California**

# The Southern Sierras Power Company
# The Nevada-California Power Company
# Holton Power Company

An All-Hydro system with eight Hydro Plants, of 68,420 H.P. installed capacity, maintaining steam and gas electric plants of 13,000 H.P. capacity for standby and emergency service. Total H.P. connected load 93,575. Plants are located on Bishop Creek, in Inyo County and on Mill and Rush Creeks, and in Owens River Gorge, Mono County, California, on the eastern slope of the Sierra Nevada Mountains. Further development now under way or projected, of water rights now owned or controlled, will bring total hydro-generated H.P. up to 150,140.

TRANSMISSION SYSTEM is longest in the world, extending from the middle of the state to a point on the Colorado River opposite Yuma, 539 miles. There are 1,418 miles of high tension transmission lines, with 239 miles of double circuit three phase, 140,000 volt steel tower line; 60 miles of 140,000 volt single circuit steel and wood pole lines; 224 miles of 87,000 volt single circuit wood pole lines; 330 miles of 55,000 volt single circuit wood pole line; 9 miles of 33,000 volt double and single circuit steel pole line; 445 miles of double and single circuit, 33,000 volt wood pole lines, and 111 miles of double and single 15,000 and 11,000 volt wood pole lines. In addition there are 476 miles of wood pole distribution line of 6,600 volts or under.

SERVES 52,000 SQUARE MILES of territory (larger than the State of Pennsylvania) in Eastern California and West Central Nevada; with a population of over 150,000. This area is rich in mineral and agricultural resources, and contains over 1,500,000 acres of land capable of intensive cultivation by water electrically pumped from underground basins.

FURNISHES POWER FOR gold, silver and lead mines in Nye and Esmeralda Counties, Nevada; and in California at Keeler, Randsburg and in the Searles Lake Districts; soda, borax, potash and chemical plants at Owens and Searles Lake and Saltdale; cement plants at Victorville, gypsum plants at Dunaway; crushed rock and clay product plants near Corona, irrigation dredges on the Colorado River; ice plants in the Coachella and Imperial Valleys; agricultural, industrial and domestic service in incorporated cities and towns and their environs in Owens River Valley, on the Mojave Desert, in Mojave River Valley, the Citrus Belt and agricultural sections of San Bernardino and Riverside Counties, the Coachella and Imperial Valleys; and wholesales power to operating companies at Yuma, Arizona and Mexicali, Lower California.

Load has grown from 5,501,251 K.W.H. in 1906 to 186,676,700 K.W.H. in 1922.

**GENERAL OFFICES RIVERSIDE, CALIFORNIA**

The
CALIFORNIA OREGON
POWER COMPANY

YOUR PARTNERS
IN PROGRESS

*To Western Industries:*

The California Oregon Power Company announces the creation in its organization of a new service called the New Industries Department. Its function is the furnishing of information on the industrial possibilities of those parts of Southern Oregon and Northern California served by the transmission lines of the Company.

A large block of hydro-electric power is available now with a reserve of vast potentialities. This reserve will be developed as it is needed; we shall expand to meet any demand which may be made on us.

Industries seeking an industrial site, with an abundant power supply, are urged to write us for further information.

THE CALIFORNIA OREGON
POWER COMPANY
MEDFORD OREGON

*What the Public Demands*
*The Utilities Supply*

The adequate, yet economical, development of our power resources has called for a high order of executive efficiency and engineering skill from men who have taken their well-earned places among the prominent builders of the West.

Their scientific planning for future growth has brought power to every community at rates that stimulate the use of electricity for an ever increasing diversity of applications.

Everywhere the increase of population, with its corresponding growth of industry and development of agriculture, is constantly making greater demands for additional generating plants, sub-stations, and distribution systems.

The records of growth and service here given are convincing proof of the desire of the great utilities of the West to serve faithfully the entire territory, providing their most vital need—**Electricity.**

In the interpretation of Western progress through the application of electric power, light, and heat in factories, in agriculture, and in the home, the

**Journal of Electricity and Western Industry**

acts as a clearing house for every branch of the electrical industry.

# Research—a sure Foundation

***1,500,000 volts available***
**(2,100,000 volts, peak value)**

Twelve years ago this Laboratory was built by the General Electric Company at its Pittsfield Works to broaden the study of high-voltage and high-frequency phenomena.

Here physical laws such as the laws of corona were first established—laws that are now being used as the basis of everyday work the world over. Other determinations have been of the utmost advantage in the development of G-E transformers—such as the world's first 220,000-volt units, completed two years ago.

The latest achievement of the Laboratory is the production recently of 1,500,000 volts, permitting still further research in high-voltage fields.

*High-Voltage Engineering Laboratory at Pittsfield*

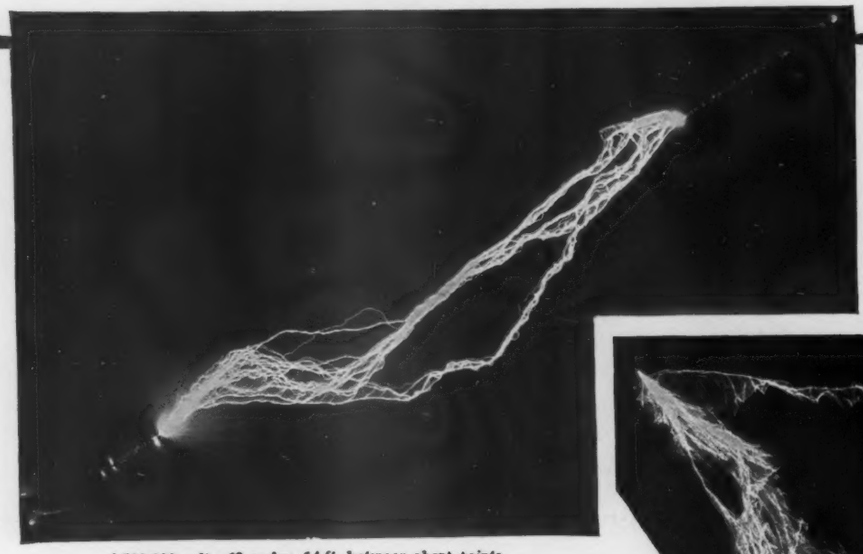
**General Electric Company**

General Office
Schenectady, N.Y.

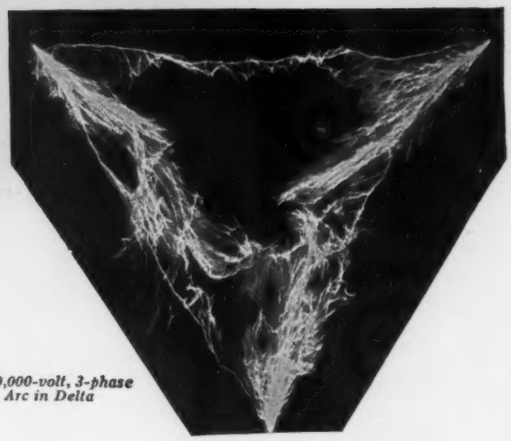
Sales Offices in all large cities

51-51

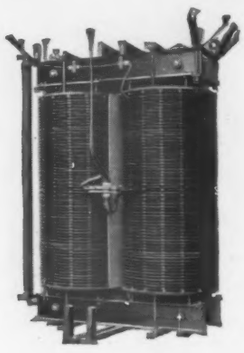
# *Determining the ultimate strength of trans-*



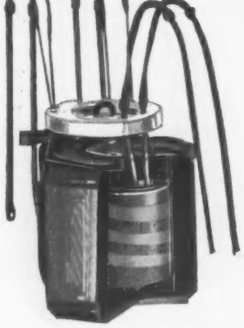
*1,500,000-volts, 60 cycles, 14 ft. between sharp points*



*1,000,000-volt, 3-phase Arc in Delta*



*16,667-kv-a. transformer for 220,000-volt circuit, the highest voltage used in transmission*



*Windings and core for a 5-kv-a. 2300-volt distribution transformer where the highest-quality insulation is no less important*

## Proving Insulation

A transformer is no better than its insulation, whether it be the 220,000-volt giant where the need for high safety factors is evident or small distribution transformers where their importance is still greater.

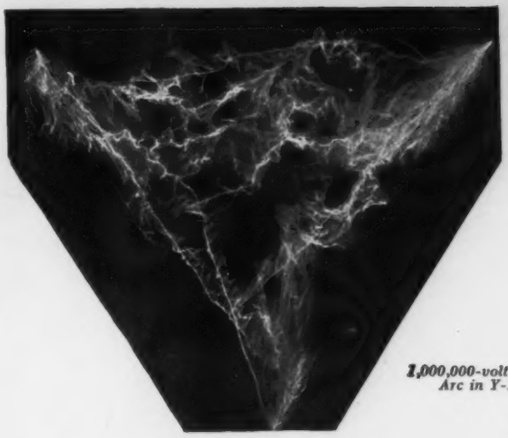
Although every square inch of sheet insulation used in Type H Transformers is passed between electric rolls to detect any invisible weakness, yet the kind, application, proper arrangement of different materials, their ultimate strengths under different phenomena and such determinations must be founded upon research from the Laboratory.

Then comes adequate testing of the finished product, which is insured by a laboratory equipped to produce any voltage or current required. The net result is a product which meets the service tests of safety, long life and high efficiency, and which has made "Type H" mean the Standard of Quality in transformers.

GENERAL

*former materials and parts is essential*

*1,000,000-volts to Ground, Arc 9-ft*



*1,000,000-volt, 3-phase Arc in Y-Delta*

# Perfecting Bushings

The perfecting of G-E Oil Filled Bushings for higher and higher voltages has kept pace with the development of G-E Transformers. The essential electrical requirements of a reliable high-voltage bushing are fully met by G-E Oil Filled Bushings:

—They will flash over repeatedly, either dry or wet, without puncture or damage.

—High impulse ratio, i.e., a lightning flashover voltage much higher than the low-frequency value, giving protective equipment a chance to operate.

—Designs for transformers and oil circuit breakers coordinated with the designs of protective apparatus such as lightning arresters, so that the bushings are interchangeable.

The construction also provides for unrestricted automatic circulation of the oil and uniform potential distribution over the external surfaces of the porcelain.

G-E High-voltage Bushings are adapted for high and low altitudes and are suitable for outdoor service.

*Dry arc-over of a 220,000-volt bushing in the Laboratory*

*Oil-filled, interchangeable, high-voltage bushings, 73,001 to 250,000 volts*

# ELECTRIC

81-52

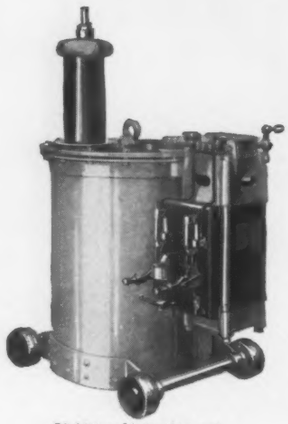
# —*And here is the testing equipment*

## For *your* problems also

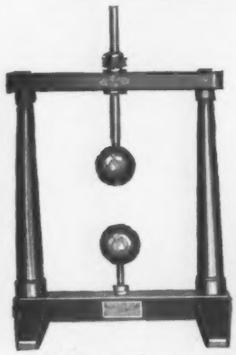
Naturally, investigations in high voltage require high-voltage testing transformers, which are the pioneers in their respective voltage classes and generally subject to the most severe operating conditions.

G-E engineers have developed a complete and reliable line of testing apparatus for research and high-voltage testing. Standardized constructions are available from the small sizes—50,000-volt sets less than three feet high—to the giant units twenty-five feet high, which are a part of million-volt equipment.

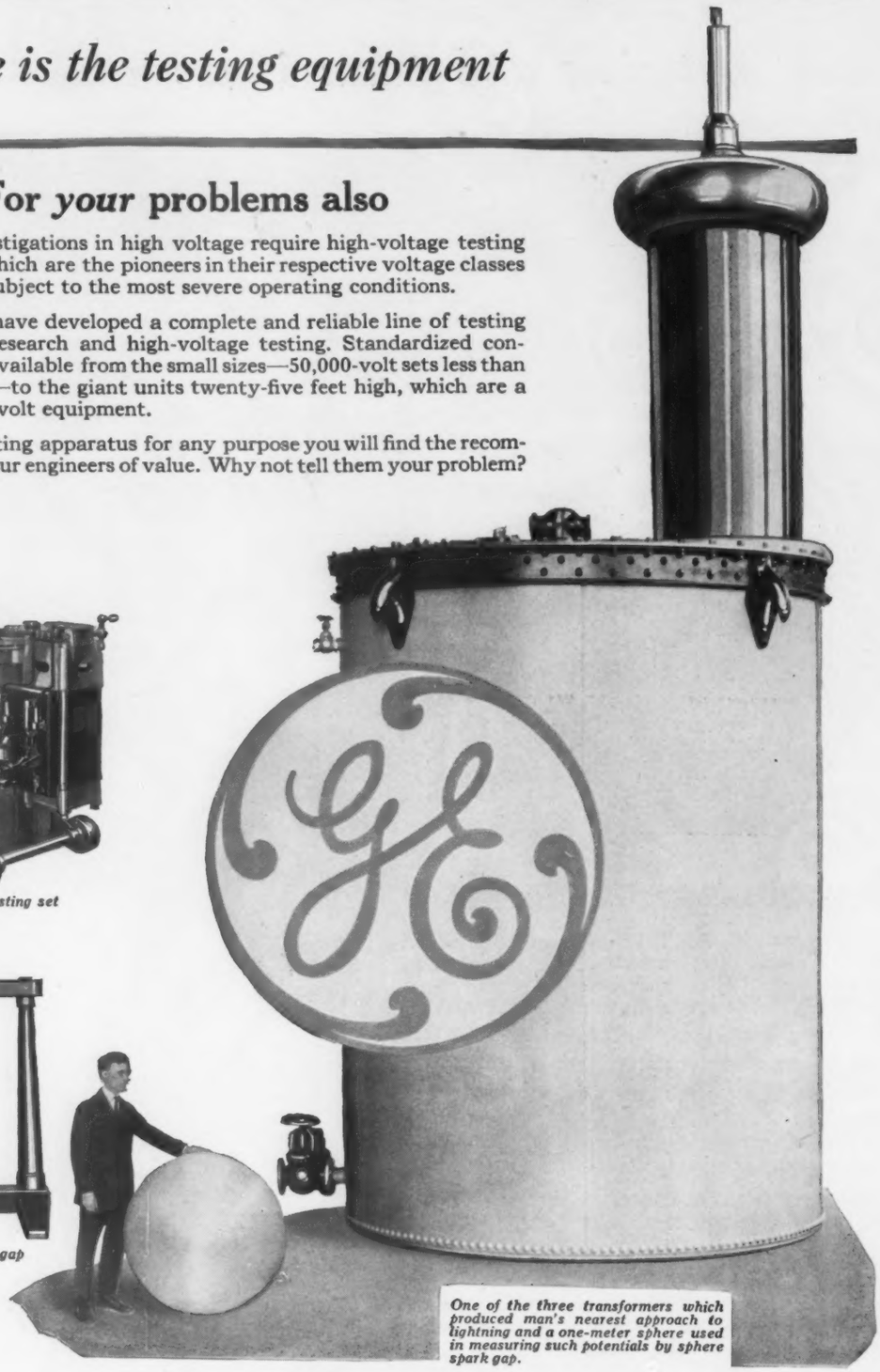
If you need testing apparatus for any purpose you will find the recommendations of our engineers of value. Why not tell them your problem?



*50,000-volt testing set*



*62.5-m.m. sphere gap*



*One of the three transformers which produced man's nearest approach to lightning and a one-meter sphere used in measuring such potentials by sphere spark gap.*

**General Electric Company**

General Office
Schenectady, N.Y.

Sales Offices in
all large cities

33A-136

# DETROIT

*"Rubber Insulated Wires and Cables for Every Electrical Purpose"*

**Lamp Cords and Telephone Wires**
**Antenna Wire**

**Rubber Covered Wires and Cables**

**Automobile Wires and Cables**
**Radio Headset Cords**

MANUFACTURED BY
DETROIT INSULATED WIRE COMPANY
DETROIT, MICH.

*Three Pacific Coast Stocks Carried by*

Baker-Joslyn Company

RELY ON LOS ANGELES SEATTLE SAN FRANCISCO SERVICE

183-199 First St.
SAN FRANCISCO

330-332 Azusa St.
LOS ANGELES

2424-28 First Ave. So.
SEATTLE

*Distributors*
Hot Galvanized Pole Line Hardware
Wood Poles, Cross Arms and Pins
Construction and Linemen's Tools
Porcelain and Glass Insulators
Porcelain Knobs, Tubes and Cleats
Insulated and Bare Copper and Iron Wires
Rigid Iron Conduit and Fittings
Flexible Metallic and Non-metallic Conduit and Armored Conductors
Switches, Switchboards and Fuses
Insulating Materials

The

50th
ANNIVERSARY

of the establishment of

THE R. THOMAS & SONS CO.
EAST LIVERPOOL, OHIO

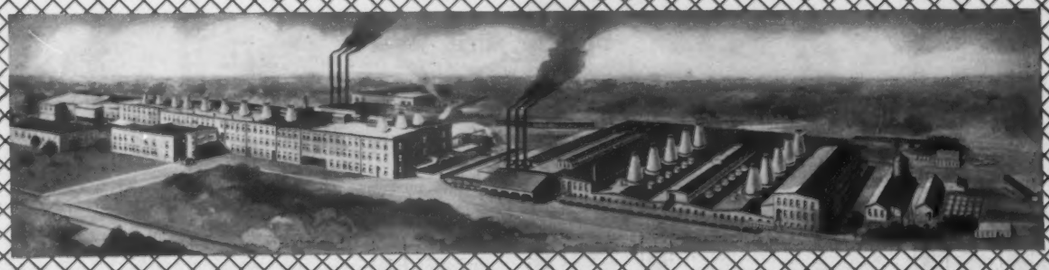
ENGINEERS MANUFACTURERS DESIGNERS

of

"THOMAS QUALITY"
ELECTRICAL PORCELAIN
INSULATORS

*THE BEST*
*by*
*LINE TEST*

1873 50 YEARS 1923



Western Electric Company
INCORPORATED

*Sole Agents on the*
PACIFIC COAST

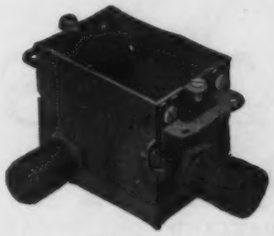
# Why

## "The House That SERVICE Built" Distributes

No. 102 Box

No. 103

"Union"
SS Single Box



Gem B Box

## RESPONSIBILITY

Ever stop to consider what position we, as distributors, occupy? We believe you will agree that it carries with it a heavy moral responsibility.

Most of our customers have plenty of work and troubles of their own and cannot waste time making an intensive study of all the electrical supplies they purchase. Therefore they rely largely on **our** judgment to furnish them only with goods which we ourselves have carefully studied and investigated and on which we can put our stamp of approval.

Realizing our great responsibility because of this fact, we would not dare to offer any goods that did not come up to our high standard. For were we to sell you just one article that did not give entire satisfaction, we would not only lose your business on that one article but on our entire line.

Therefore, when we recommend to you the line of "Union" Outlet Boxes and "Union" and "Gem" Switch Boxes, you may rest assured that these have been found by us to be the very best on the market.

## "UNION" and "GEM"
## Outlet and Switch Boxes

are the original boxes and are recognized by all who know as the **standard** line.

Let us give you full particulars and prices.

# ELECTRIC APPLIANCE COMPANY

**807-809 Mission Street** **San Francisco**

# "Check" Seal Progam for 1923

THAT the "Check" Seal Program has justified itself as a constructive force in behalf of higher electrical contracting standards and the resulting benefits to the industry, is indicated by the Pacific States Electric Company's advertising plans for 1923.

The 1923 "Check" Seal Program is designed to consolidate and further the progress achieved in 1922.

An extended newspaper schedule will employ twenty-five leading papers throughout the Pacific Coast territory, with a combined circulation of more than 1,100,000. Each paper will forcefully present the "Check" Seal story in ten separate advertisements, giving a combined circulation for the year of more than 11,000,000 separate copies.

In addition to this will be an outdoor program which will tell the "Check" Seal story upon the billboards of thirty Coast cities. Many of these boards will be painted and illuminated and the showings will alternate with the newspapers in keeping the "Check" Seal principles constantly before the public.

That these principles offer a sound and constructive basis for the development of the entire electrical industry is demonstrated by their wide acceptance wherever they are placed in operation.

Quality Electrical Merchandise
Chosen from the Markets of the World
THE MARK THAT STANDS
INSPECTED & CHECKED by
PACIFIC STATES ELECTRIC COMPANY

T. M. Reg. 1921

PACIFIC STATES
ELECTRIC COMPANY

SAN FRANCISCO PORTLAND LOS ANGELES SEATTLE OAKLAND SPOKANE

*Appearing on the opposite page is a reproduction of the first full page of the 1923 newspaper series.*

# Towers of Service

EVERYONE who knows the West, knows its electrical transmission towers Spanned by gleaming strands of copper wire, they lead from mountain sources, over foothills and across valleys, bearing the forces of light, heat and motion to factories, farms and homes. They are Towers of Service, and their constantly increasing numbers are visible evidence of how well the power companies are fulfilling their obligation to supply energy to the consumers of the Pacific Coast.

That these Power Companies are furnishing abundant and economical energy is beyond question. But how well this power serves industry, commerce and the home depends largely upon the type of installation made by electrical contractors and upon the quality of electrical materials, devices and appliances used.

If the full measure of service is to be available, homes, factories and stores must be wired with standard materials. Enough outlets must be provided to permit the full use of electrical appliances and these appliances must likewise be of standard manufacture

To secure such an installation go to a "Check" Seal contractor-dealer These men operate on the basis of good workmanship, standard materials and fair prices They know the latest electrical developments and are qualified to make an installation which conforms to these requirements in every respect.

"Check" Seal contractor-dealers are identified by the orange and blue "Check" Seal of the Pacific States Electric Company, the largest distributor of electrical merchandise on the Pacific Coast The same mark appears on a complete line of electrical materials and appliances which are inspected and certified as standard

*Ask for the "Check" Seal*

*Various items of a complete line of standard electrical materials and appliances certified by the "Check" Seal and sold by qualified electrical contractor-dealers, are described in our new booklet, "The Electrical How for Householders." You will enjoy this booklet, with its many practical suggestions for the convenient and economical use of electricity in your home. It may be obtained free from any electrical contractor or dealer displaying this seal or by writing to one of our offices*

PACIFIC STATES
ELECTRIC COMPANY

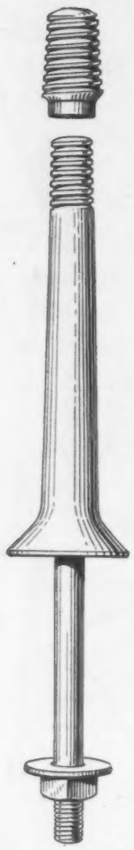
SAN FRANCISCO LOS ANGELES OAKLAND SEATTLE PORTLAND SPOKANE

*Go to dealers and electrical contractors who display the "Check" Seal.*

Quality Electrical Merchandise
THE MARK THAT MEANS
INSPECTED & CERTIFIED by
PACIFIC STATES ELECTRIC COMPANY
Chosen from the Markets of the World

## "HUBBARD MAKES THE HARDWARE THE HARDWARE MAKES THE LINE"

# *Peirce forged steel pins with separable thimbles*



This insulator pin is hot galvanized, double dipped and forged from a single block of high grade steel. It has neither welds nor joints.

A glance at the illustration shows that its strength is uniform in all directions. There are no flanges or webs which must be placed in line with the strain. Projections which concentrate electrostatic stresses have been eliminated. Full strength is carried to the top of the insulator bore and there is no weakness at the base of the thimble.

### *Drawn Zinc Thimbles*

If insulators with cemented thimbles are used the Peirce Drawn Zinc Thimble is an added factor of safety. The thinness of the zinc prevents any appreciable amount of expansion.

### *Lead Thread Thimbles*

If insulators without cemented thimbles are used the Peirce Lead Thread Thimble can be screwed on the pin, providing a firm, rigid seat for the insulator and one that will absorb expansion due to temperature changes, thus protecting the insulator.

### *Guarantee*

The Peirce Forged Steel Pin, in any size or type, is guaranteed to stand the application of a dead end strain equal to its rated strength, applied at the insulator groove, with a deflection of less than 10 degrees, and without damage to the insulator.

## HUBBARD & COMPANY
Pittsburgh, Pa.

Quality Electrical Merchandise — Chosen from the Markets of the World — THE MARK THAT MEANS INSPECTED & CERTIFIED by PACIFIC STATES ELECTRIC COMPANY

T. M. Reg. 1921

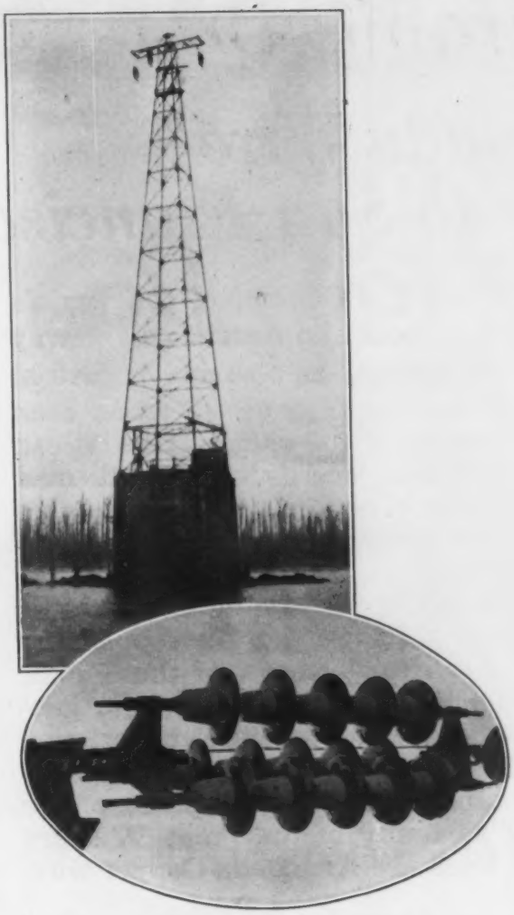
## PACIFIC STATES ELECTRIC COMPANY

SAN FRANCISCO LOS ANGELES OAKLAND PORTLAND SEATTLE SPOKANE

*Distributors for the Pacific Coast*

# *Insulating the power routes of the West—No. 6*

## *The Northwestern Electric Company Uses Locke Insulators*



THE Pacific Northwest has forged to the front in electrical progress. Its potential water powers are being developed rapidly. Locke Insulators on the lines of the Northwestern Electric Company are functioning successfully year after year.

A leader in insulator development since 1893, the Locke Insulator Corporation has always endeavored to anticipate the needs of electrical transmission by constantly extending technical research and plant capacity. How well others have appreciated this activity is proved by the number of high voltage lines which are equipped with Locke Insulators.

*The illustration at the left shows the Columbia River Crossing of Northwestern Electric Company, equipped with Locke insulators.*

*Manufactured by*

**LOCKE INSULATOR CORP.**
**VICTOR, NEW YORK**

PACIFIC STATES
ELECTRIC COMPANY
SAN FRANCISCO LOS ANGELES OAKLAND PORTLAND SEATTLE SPOKANE

*Exclusive Pacific Coast Sales Agents*

Quality Electrical Merchandise
THE MARK THAT MEANS INSPECTED & CERTIFIED by PACIFIC STATES ELECTRIC COMPANY
Chosen from the Markets of the World

T. M. Reg. 1921

# *Many Miles of Anaconda Wire Bring Power to San Francisco*

SAN FRANCISCO, one of the world's finest harbors and America's gateway to the Orient, is also an industrial center of national importance. As has been the case with most of the cities of the West, abundant electrical energy, delivered over hundreds of miles of copper wire, has been an invaluable contributor to San Francisco's industrial growth.

The Anaconda Copper Mining Company, is the logical source of supply for the copper wire used in the electrical systems of the Pacific Coast. A superior product, a strategic geographical location, unexcelled transportation facilities and a manufacturing capacity adequate to fill orders promptly are some of the reasons why so many of the great Western transmission lines use Anaconda Copper wire.

**ANACONDA COPPER MINING COMPANY**

**Rolling Mills Department**
**111 W. Washington Street**
**Chicago, Ill.**

PACIFIC STATES
ELECTRIC COMPANY

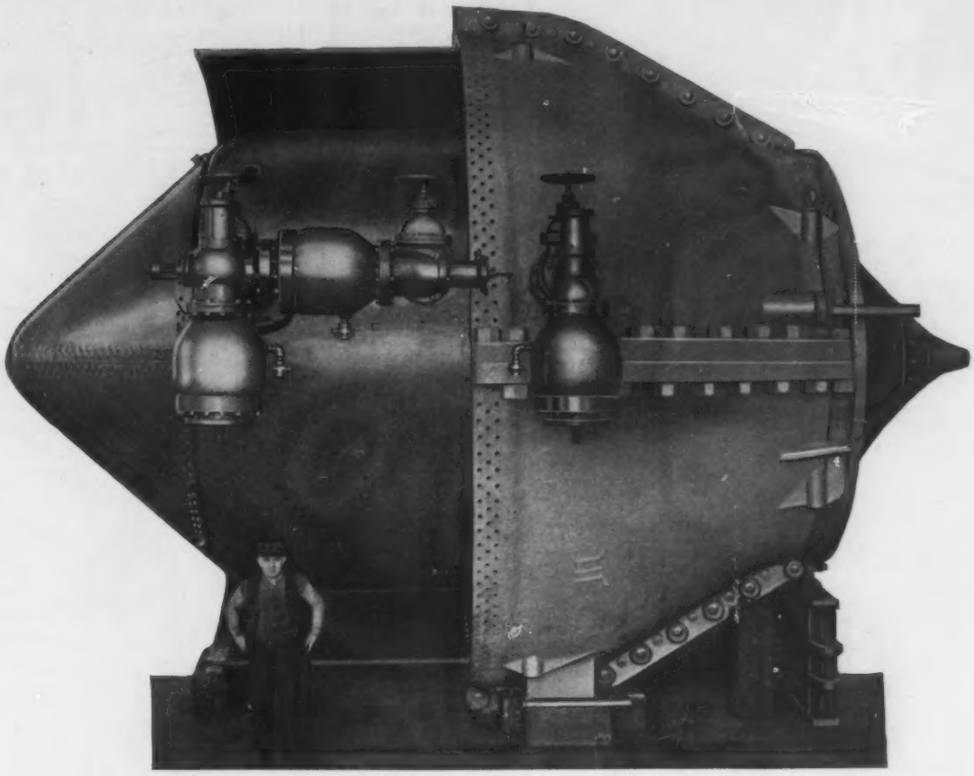
SAN FRANCISCO LOS ANGELES OAKLAND PORTLAND SEATTLE

*Distributors for the Pacific Coast*

# I. P. Morris Department

## The Wm. Cramp & Sons Ship & Engine Building Co.

**Richmond and Norris Sts., Philadelphia**



**One of Five 14 ft. Inlet x 10 ft. Outlet Johnson Hydraulic Valves**

**Built For**

**The Hydro-Electric Power Commission of Ontario**
**Queenston Development**

A contract has recently been received for three 21 x 14 ft. Johnson Valves for Plant No. 3 of the Niagara Falls Power Co.

***Designers and Builders of***

# JOHNSON HYDRAULIC VALVES

**ASSOCIATED COMPANIES**

**The Pelton Water Wheel Co., San Francisco and New York.**
**Dominion Engineering Works, Ltd., Montreal, Canadian Licensees.**

1896
Standard Underground Cable Co.
ELECTRICAL WIRES
CABLES
Hemingray Insulators
The Chas. F. Sloane Co.
A HEART TO HART TALK
The Hart & Bogumus Manufacturing Co.
Disposition of Three-Phase Lines
The Journal of
ELECTRICITY
POWER AND GAS
WESTON
DYNONITE
STANDARD UNDERGROUND CABLE CO.
General Electric Company
DYNAMOS and COMPLETE PLANTS
1906
Westinghouse
Outdoor Type D Oil Switch
WESTINGHOUSE ELECTRIC & MFG. CO.
IT IS NATURAL
California Incandescent Lamp Co.
THE 1900 DRY BATTERY
Electric Appliance Company
WATER WHEELS
3 FEET TO 2000 FEET.
ELECTRIC POWER AND LIGHTING PLANTS.
JAMES LEFFEL & CO., Springfield, Ohio, U.S.A.
There are more
"Locke" Insulators
In use on Power Transmission Lines on the Pacific Coast than there are of any other manufacture.
"LOCKE" INSULATORS USED BY THE FOLLOWING PLANTS IN CALIFORNIA:
"THOMAS" QUALITY
HIGH VOLTAGE INSULATORS
California Electrical Works
San Francisco
Western Electric Co. Seattle
California Electric Co. Los Angeles
PACKARD
PASS & SEYMOUR
Electrical Specialties in Porcelain
PUSH
SIMPLEX
WIRES
CABLES
The Safe and Use of Electric Heating and Cooking Appliances They Increase Your Day Load and SIMPLEX are absolutely Satisfactory. Guaranteed. We have a Complete Stock. Send for catalogue and discounts.
Standard Electrical Works
SAN FRANCISCO, CAL.
CROCKER-WHEELER
Benjamin Wireless Clusters
BENJAMIN ELECTRIC MFG. CO.
SAN FRANCISCO
D & W NON-ARCING FUSES
and SAFETY DEV
ALLIS-CHALMERS CO.
MILWAUKEE, WIS., U. S. A.
In the Equipment of Power Plants We Lead the World
Wagner Electric Manufacturing Company
Wagner-Bullock Electric Company of California
Bryan-Marsh Company
136 Liberty Street, New York
The Bryan-Marsh lamps are sold with the luminous-like guarantee that they will deliver more light (candle hours) for one cent than lamps of any competitor
"Noark"
Fuses
H. W. JOHNS-MANVILLE CO.
INDUSTRIAL
I.P.MORRIS

## The Test of Time

FORTY-FIVE years ago, the first central station was installed in San Francisco. This station owned by the California Electric Light Company with its 45 hp. boiler and its 16-light Brush dynamo was a miniature indeed when compared with the modern 100,000 hp. hydroelectric plant.

Since 1879, great developments have taken place in every phase of the electrical industry of the West. During this period, many manufacturers whose names are familiar in the industry today have contributed much in this development program.

It is significant to note that these firms whose advertisements we have clipped from the 'Journal of Electricity, Power & Gas' as published 25 years ago are still counted among those who believe in the West as a market for their products and in the 'Journal of Electricity' as the best medium to carry their message to the industry.

# Western Progress Number

**February 1, 1923**

WHETHER you shared in the business done in the West during the past years, or in order that you may share in the business to be done in 1923, you will recognize in our February 1 issue an opportunity to tell your sales story to an attentive audience.

The progress of the electrical development of the West as the editorial theme of the issue will be emphasized as follows:

(1) Review of Market in Power Company Field.

A comprehensive tabulation of specific data on (a) Western power developments to date (b) those now under construction and (c) those projected for the near future.

(2) Review of Merchandising and Construction Fields.

An analysis of the Western market for (a) household electric appliances (b) electric construction materials and (c) supplies. Charts and tables will reveal the significance of the remarkable building activity of the principal Western cities as it affects the electrical industry.

(3) The West as a Potential Electrical Market for 1923.

Brief personal viewpoints on the business outlook for the West during 1923 by prominent leaders in Western electrical field. These will include Manufacturers, Jobbers, Power Company officials, Electrical Dealers, Financiers, Manufacturer's Agents, etc.

(4) Development of the Hydroelectric Industry in the West.

An historical record of the development of the hydroelectric central stations of the West. This will contain a comprehensive listing of each Western power plant since the birth of the electrical central station in San Francisco, June 30, 1879.

(5) Map of Western Interconnected Power System.

A large 3-color map supplement showing the inter-connected power system of the 11 Western States. This map will be the last word in every detail, and as such a valuable reference.

Every executive, every merchant, every buyer takes an inventory of physical assets January 1st.

By February 1st, he is ready to study and analyze economic conditions. A review of 1922 and an outline of the general development program of the West for 1923 in our Western Progress Number will assist him to determine the course he will pursue.

Our February 1st number, then, is your opportunity to reach this market at the psychological time. Do not delay. Make your space reservation today and let your copy follow later.

Forms close January 20th.

**Journal of Electricity**
**and Western Industry**

RIALTO BUILDING SAN FRANCISCO

ALLIS-CHALMERS A-C MILWAUKEE

PRODUCTS:

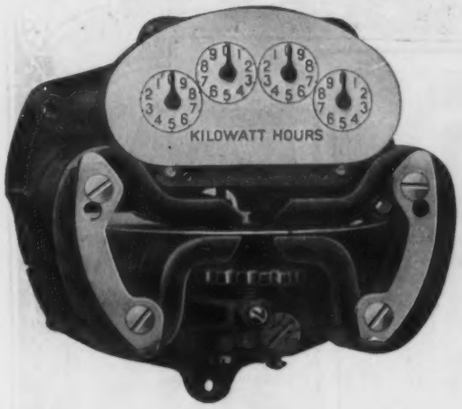
Electrical Machinery
Gas Engines
Steam Engines
Steam Turbines
Condensers
Oil Engines
Hydraulic Turbines
Pumping Engines
Centrifugal Pumps
Mining Machinery
Metallurgical Machinery
Crushing Machinery
Cement Machinery
Flour Mill Machinery
Saw Mill Machinery
Air Compressors
Air Brakes
Steam and Electric Hoists
Farm Tractors
Power Transmission Machinery

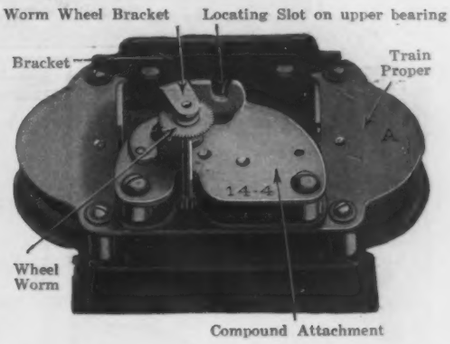
# For The Big Loads at Central Stations—

Allis-Chalmers Power Transformers are giving continuous uninterrupted service in many of the large generating and sub-stations of the country which is the best assurance of high class workmanship, high grade materials, and the best of engineering.

*Send for Bulletin*

ALLIS-CHALMERS
MANUFACTURING COMPANY
MILWAUKEE, WISCONSIN. U.S.A.




# Sangamo Meter Trains are Built Right

THE recording train of a Watt-hour meter **must** be built right or meter accuracy is impossible. The recording trains of Sangamo meters **are** built right. Friction in the train is reduced to a minimum through accurate meshing of gears and pinions scientifically cut one tooth at a time like all high-grade gears. Corrosion of parts is avoided by using nickel plated brass throughout. In fact the Type "H" meter will show no difference in speed on a very light load whether recording train is on or off.

With Sangamo Meters the recording train **cannot** be attached incorrectly. The entire mechanism is carried on a rigidly formed and swaged brass bracket, accurately located by two dowel pins set in the top face of the grid. This mechanism is held to the grid by two screws very easily accessible from the top when it is desirable to remove the train.

A slot in the worm wheel bracket which engages the upper bearing screw itself insures a positive position and correctly maintained mesh between the worm of the moving element and the worm wheel of the train.

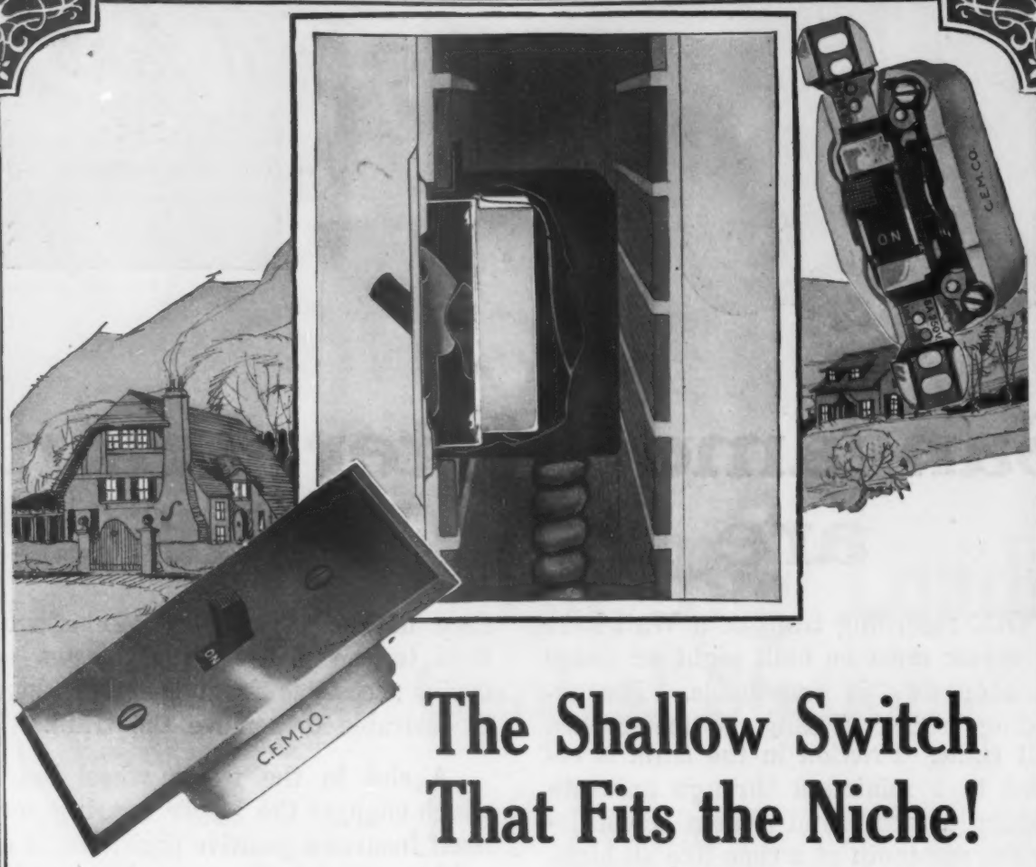
The same careful design which insures accurate performance of the train is carried out in all other parts of Type "H" Meters. Our nearest agents will be glad to give you details. Write us today for Bulletin 5521, fully describing Type "H" Alternating current Watthour Meters.

SANGAMO

## Sangamo Electric Company
### Springfield, Illinois

New York Chicago St. Louis San Francisco Los Angeles

2073




# The Shallow Switch That Fits the Niche!

WHEN you want to wire thin partitions—such as in hotels or apartment houses—here is exactly the Toggle Switch you need. It's a "Connecticut"—a brand new model. It is small in size, very shallow, yet it leaves ample room in the box for the wires. We want you to get acquainted with this greatly-improved Toggle Switch. Test it! Convince yourself. You'll find it will carry three times its rated load. And mechanically it is so well made that it will outlast any average requirement by many years!

No longer do you have to worry about doing a job of wiring in a two-inch partition, with an inch-and-a-half wall box. This thin model "Connecticut" solves the problem. It saves time for you. And therefore makes money for you! The line is complete—including a shallow box 1½ inches deep—thus eliminating the use of wood mats. . . . Get in touch now with your Jobber—or with us.

## Connecticut Electric Mfg. Co.

*Office and Factory:* **Bridgeport, Conn.**

*Branch Offices:*

New York
Aeolian Bldg.

Chicago
Manhattan Bldg.

San Francisco
74 New Montgomery St.

***"Connecticut" Means Quality!***

## Commercial Lighting Customers

| State and Sections | Jan. 1, 1922 Total Number (Thousands) | New Customers During 1921 (Thousands) | Per Cent Gain During 1921 |
|---|---|---|---|
| United States | 1,896.9 | 152.4 | 8.7 |
| SECTIONS | | | |
| New England | 158.2 | 13.4 | 9.2 |
| Middle Atlantic | 460.7 | 35.2 | 8.2 |
| South Atlantic | 132.9 | 12.8 | 10.6 |
| East North Central | 464.1 | 38.5 | 8.9 |
| West North Central | 243.3 | 13.4 | 5.8 |
| East South Central | 58.8 | 3.5 | 6.3 |
| West South Central | 81.6 | 6.3 | 8.4 |
| Mountain | 55.7 | 0.8 | 1.3 |
| Pacific | 241.6 | 28.5 | 13.3 |
| NEW ENGLAND: | | | |
| Maine | 24.8 | 1.5 | 6.4 |
| New Hampshire | 3.1 | 0.1 | 3.2 |
| Vermont | 11.5 | 0.9 | 8.4 |
| Massachusetts | 67.5 | 6.1 | 10.0 |
| Rhode Island | 25.1 | 3.2 | 14.6 |
| Connecticut | 26.2 | 1.6 | 6.5 |
| MIDDLE ATLANTIC: | | | |
| New York | 252.0 | 19.5 | 8.4 |
| New Jersey | 66.0 | 5.0 | 8.2 |
| Pennsylvania | 142.7 | 10.7 | 8.2 |
| SOUTH ATLANTIC: | | | |
| Delaware | 3.4 | 0.3 | 9.6 |
| Maryland | 18.5 | 2.3 | 14.2 |
| District of Columbia | 12.5 | 1.4 | 12.5 |
| Virginia | 13.0 | 0.2 | 1.5 |
| West Virginia | 9.2 | 1.4 | 17.9 |
| North Carolina | 20.8 | 1.8 | 9.3 |
| South Carolina | 13.1 | 2.5 | 23.6 |
| Georgia | 28.4 | 1.4 | 5.2 |
| Florida | 14.0 | 1.5 | 12.0 |
| EAST NORTH CENTRAL: | | | |
| Ohio | 96.6 | 5.2 | 5.6 |
| Indiana | 42.0 | 4.3 | 11.3 |
| Illinois | 170.3 | 16.5 | 10.8 |
| Michigan | 111.2 | 9.0 | 8.8 |
| Wisconsin | 44.0 | 3.5 | 8.6 |
| WEST NORTH CENTRAL: | | | |
| Minnesota | 56.1 | 2.9 | 5.4 |
| Iowa | 27.6 | 2.5 | 10.0 |
| Missouri | 74.4 | 4.2 | 6.1 |
| North Dakota | 13.3 | 0.7 | 5.5 |
| South Dakota | 12.5 | 0.7 | 6.0 |
| Nebraska | 31.0 | 1.0 | 3.3 |
| Kansas | 28.4 | 1.4 | 5.2 |
| EAST SOUTH CENTRAL: | | | |
| Kentucky | 24.2 | 1.9 | 8.5 |
| Tennessee | 13.5 | 0.6 | 4.6 |
| Alabama | 9.1 | 0.5 | 5.8 |
| Mississippi | 12.0 | 0.5 | 4.2 |
| WEST SOUTH CENTRAL: | | | |
| Arkansas | 12.8 | 0.4 | 3.2 |
| Louisiana | 12.6 | 0.8 | 6.8 |
| Oklahoma | 13.6 | 1.5 | 12.4 |
| Texas | 42.6 | 3.6 | 9.2 |
| MOUNTAIN: | | | |
| Montana | 8.6 | —0.1 | —1.1 |
| Idaho | 12.1 | —0.2 | —1.6 |
| Wyoming | 4.9 | 0.5 | 11.3 |
| Colorado | 14.6 | 0.4 | 2.8 |
| New Mexico | 2.3 | 0.1 | 4.5 |
| Arizona | 2.0 | 0.0 | 0.0 |
| Utah | 9.5 | 0.0 | 0.0 |
| Nevada | 1.7 | 0.1 | 1.4 |
| PACIFIC: | | | |
| Washington | 40.3 | —0.6 | —1.5 |
| Oregon | 16.0 | 1.1 | 7.3 |
| California | 185.3 | 28.0 | 17.8 |


# *"We Told You So!"*

**——California and the West constitute a potential market of active electrical development.——**Figured numerically or on a percentage basis, here is a field of unsurpassed electrical expansion that stands out as a "high spot" among all parts of the country.

YOU can best reach this market through the Journal of Electricity and Western Industry.

ELECTRICAL WORLD
DECEMBER 9, 1922

California reports the second largest number of commercial lighting customers, with 185,300. The reason, however, for this relatively large number of customers is quite different from that given for New York State. Almost one-third of the people of California live in rural districts, but the transmission and distribution systems of the central-station companies of that state cover virtually every rural section, and it is a very rare exception when rural hotels and stores are not electrically lighted. Moreover, California's commercial growth is recent and rapid as compared with that of the older states of the East, California's population having quadrupled during the last forty years.

# The Figures—
## They Speak for Themselves!

DOUBLE the average per cent gain for the whole U. S.

A greater numerical gain than **any other** state.
Over 9 times the average numerical gain for the whole U. S.

California alone—9.8% of the national total.
11 Western States—15.8% of the national total.

**Journal of Electricity and Western Industry**

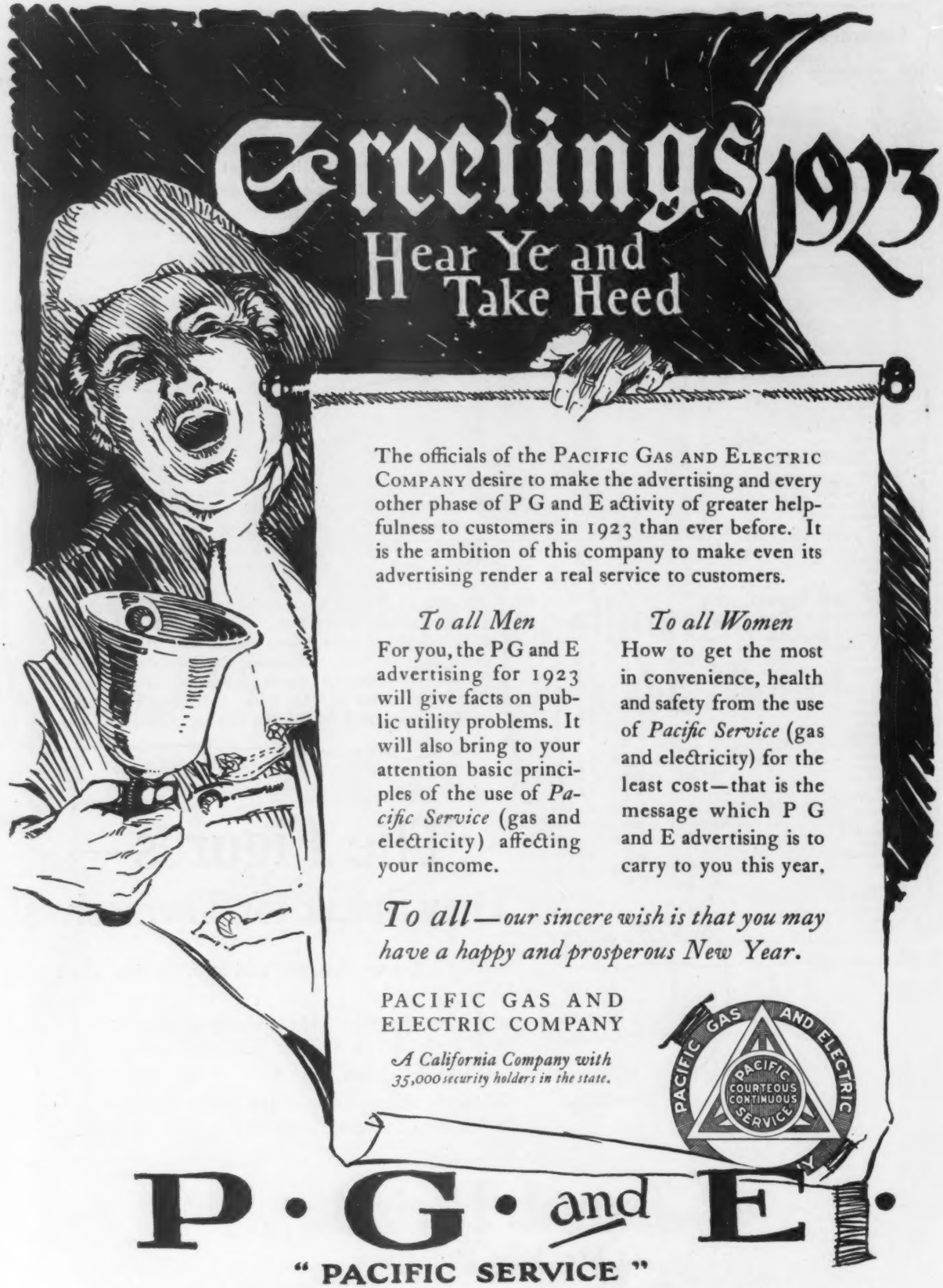
New York
G. H. Duffield
10th Ave. at 36th St.

Chicago
A. Hauptli, Jr.
1570 Old Colony Bldg.

Rialto Building
San Francisco

Philadelphia
R. F. Beard
Real Estate Trust Bldg.

St. Louis
M. E. Herring
713 Star Bldg.




The officials of the PACIFIC GAS AND ELECTRIC COMPANY desire to make the advertising and every other phase of P G and E activity of greater helpfulness to customers in 1923 than ever before. It is the ambition of this company to make even its advertising render a real service to customers.

*To all Men*

For you, the P G and E advertising for 1923 will give facts on public utility problems. It will also bring to your attention basic principles of the use of *Pacific Service* (gas and electricity) affecting your income.

*To all Women*

How to get the most in convenience, health and safety from the use of *Pacific Service* (gas and electricity) for the least cost—that is the message which P G and E advertising is to carry to you this year,

*To all—our sincere wish is that you may have a happy and prosperous New Year.*

PACIFIC GAS AND ELECTRIC COMPANY

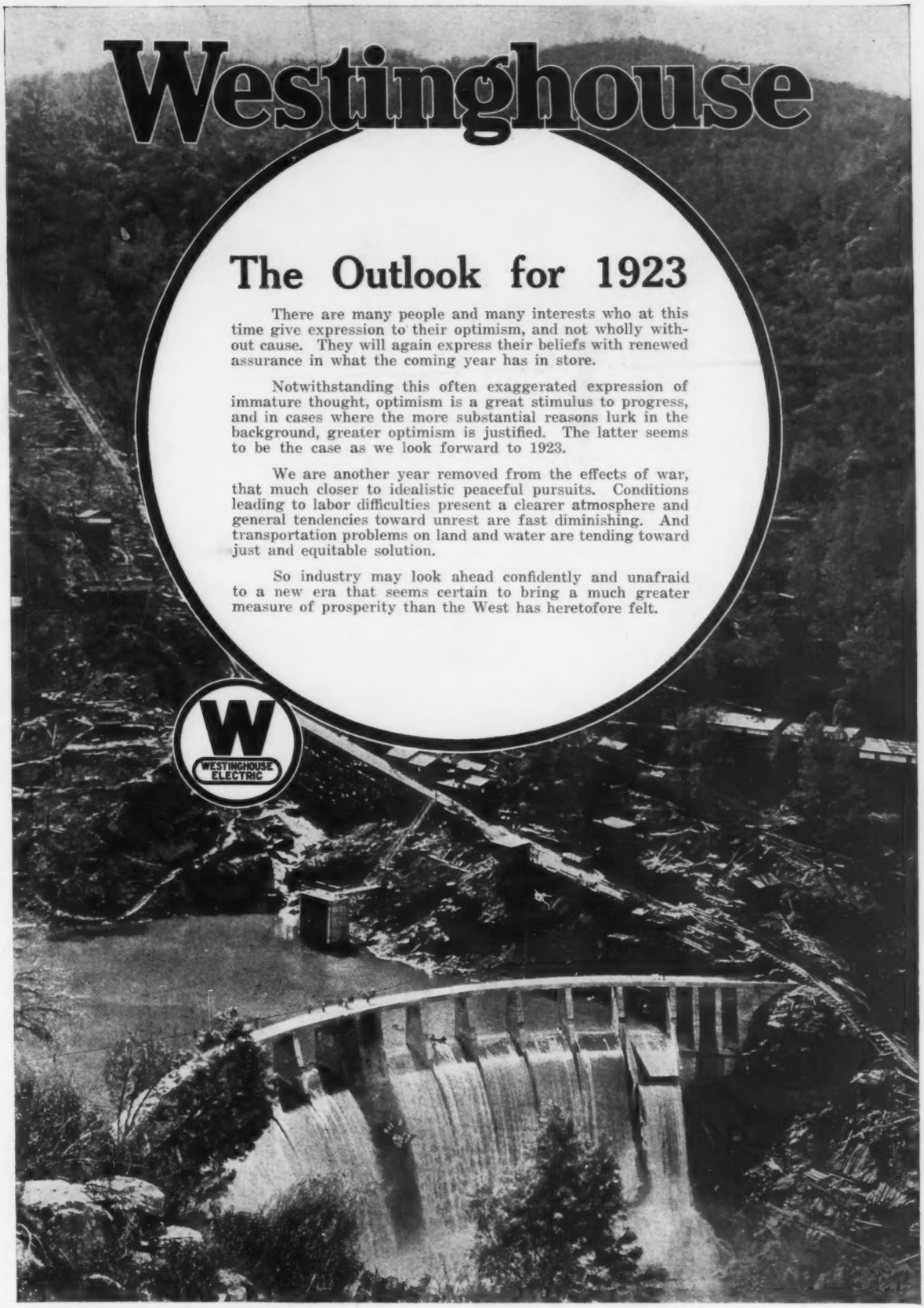
*A California Company with 35,000 security holders in the state.*

PACIFIC GAS AND ELECTRIC — PACIFIC COURTEOUS CONTINUOUS SERVICE

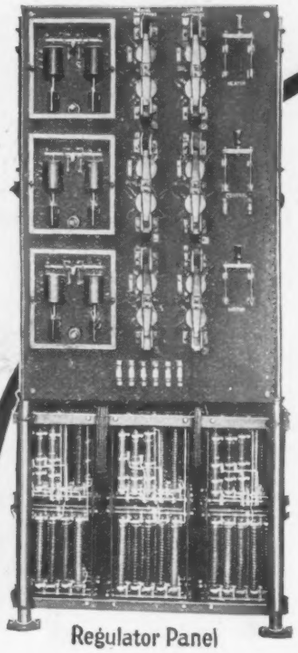
**P · G · and E ·**

**"PACIFIC SERVICE"**

GENERAL OFFICES 445 SUTTER STREET, SAN FRANCISCO


Westinghouse
The Outlook for 1923
There are many people and many interests who at this time give expression to their optimism, and not wholly without cause. They will again express their beliefs with renewed assurance in what the coming year has in store.
Notwithstanding this often exaggerated expression of immature thought, optimism is a great stimulus to progress, and in cases where the more substantial reasons lurk in the background, greater optimism is justified. The latter seems to be the case as we look forward to 1923.
We are another year removed from the effects of war, that much closer to idealistic peaceful pursuits. Conditions leading to labor difficulties present a clearer atmosphere and general tendencies toward unrest are fast diminishing. And transportation problems on land and water are tending toward just and equitable solution.
So industry may look ahead confidently and unafraid to a new era that seems certain to bring a much greater measure of prosperity than the West has heretofore felt.
W
WESTINGHOUSE ELECTRIC

# Westinghouse Automatic Arc Furnace Regulators



Regulator Panel

Control Panel used when meters are installed on main Switchboard

## —can be used in any type of Electric Furnace having movable electrodes

In the case of the electric furnace wherein large amounts of electric energy is used, it is necessary not only to obtain the greatest efficiency possible with respect to the consumption of energy, but to maintain conditions that insure a finer product and a longer life to the apparatus in use.

Westinghouse Automatic Furnace Regulators will enable you to arrive at the above conditions in electric furnace operation. They at once obtain a more efficient use of power input. They automatically maintain stable arc conditions, both current and voltage. Through the complete automatic control of the furnace from the starting of heat you can obtain:

1. A material reduction in the time required per heat.
2. A saving in power, labor and overhead expense.
3. A product of more uniform character, and of higher quality.

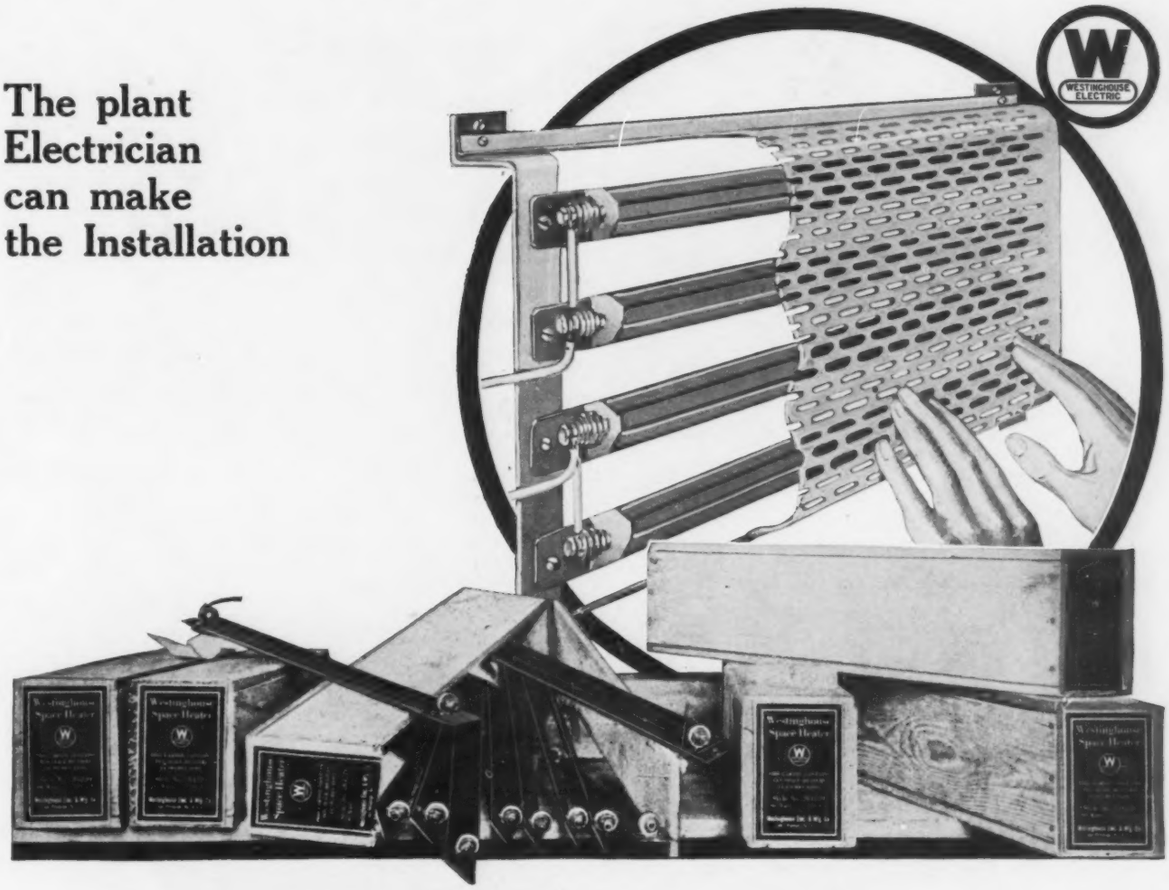
Heating engineers in any Westinghouse district office will be glad to analyze your particular problems and render any other assistance possible.

Switchboard with Control Equipment

**Westinghouse Electric & Manufacturing Co.**
**East Pittsburgh, Pa.**

# Westinghouse

**The plant Electrician can make the Installation**




# Apply Electric Heat Just as You Want It

The Westinghouse Space Heater is designed to meet the demand of thousands of industrial heating applications. Due to totally enclosed elements, the heater may be used for liquid, metal or air heating with equal success. The three standard sizes, 12, 24 and 43-inch lengths make it possible to install in a wide range of capacities and in most any position desired.

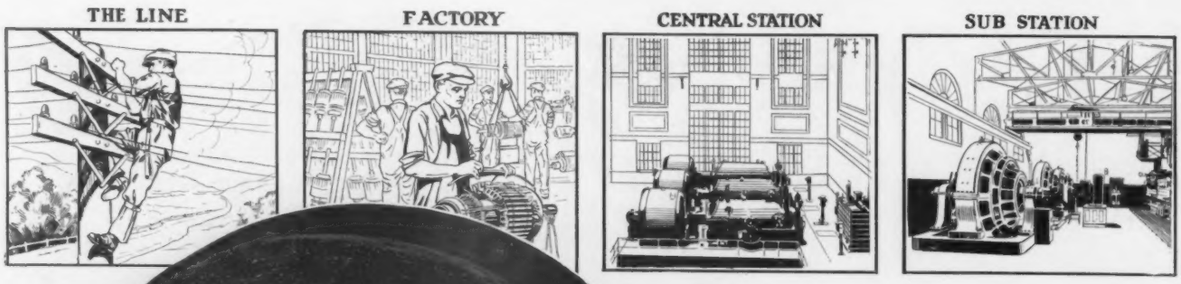
They are very rugged in construction, using a sheet metal outer casing which forms the sheath and also has the supporting holes. The electrical connections are insulated from the supports making the heater ideal for attaching directly to plates, tanks or other metal parts, without danger of short circuiting or ground.

Westinghouse Space Heaters find many uses in garages, laundries, bakeries, restaurants, printing plants, foundries, repair shops, green houses, elevators, street cars, etc., where they can be installed with little effort and made to serve most any specific purpose.

Any Westinghouse Agent-Jobber will have these heaters in stock to supply your immediate needs. Consult them or any district office.

**Westinghouse Electric & Manufacturing Co.**
**East Pittsburgh, Pa.**

# Westinghouse



# Indispensable to Western Industry

There are countless instances amidst the hum of industry's wheels when the application of insulating tape is not only a source of immediate relief, but of great consequence in the saving of time and expense. This may be applied to electrical apparatus or otherwise.

A roll of tape, as simple as it may seem, is devoid of the value it should have unless it has its original adhesive properties, insulating qualities and uniformity of material. And just these are the values assured in Westinghouse tapes through rigid and frequent inspection. Westinghouse tapes are made in various grades and of different materials to meet particular needs. Every pound is the same in all characteristics. Every roll is like the last.

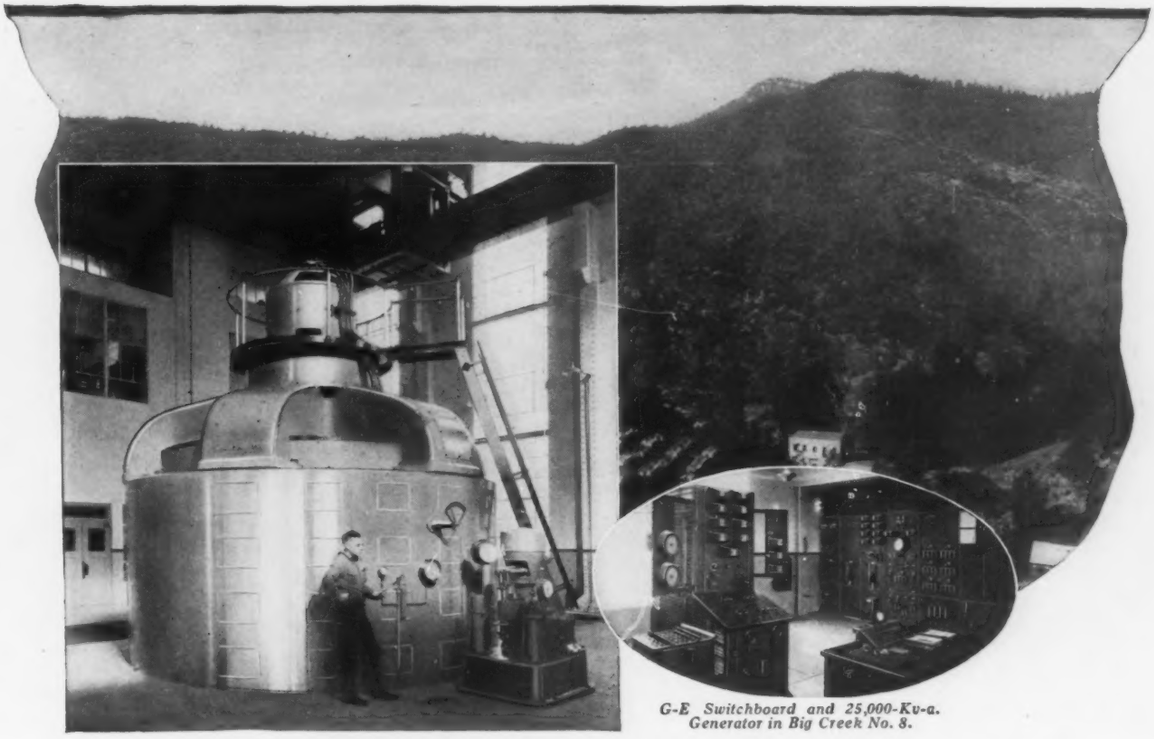
Specify and use Westinghouse—the tapes of uniform quality. They include Adhere Friction Tape, IXL Friction Tape, Westinghouse Friction Tape, Westinghouse Cable Tape, and Pittsburgh Splicing Compound.

**Westinghouse Electric & Manufacturing Company**
East Pittsburgh, Pa.

San Francisco, 1 Montgomery St.
Seattle, Second and Cherry Sts.
Portland, Broadway and Morrison Sts.
Salt Lake City, 2nd South and Main Sts.
Denver, 910 Fifteenth St.
Los Angeles, 7th and Spring Sts.

**Westinghouse**

# *Electricity is essential to industrial growth*



*G-E Switchboard and 25,000-Kv-a. Generator in Big Creek No. 8.*

## Maintaining Western Leadership

During the past ten years the number of manufacturing plants in Los Angeles has increased 158%. In the same period the value of the products manufactured has increased 704%, representing in 1921 a value of $691,000,000.

Electric power in the West, abundant and inexpensive, is the principal reason for this tremendous growth. And in this expansion G-E equipment, service, and cooperation are important factors.

For example, the 25,000-Kv-a. 10,000-volt generator, the 8333-Kv-a. 220,000-volt Transformers, the 220,000-volt oil circuit breakers and the switchboard at the Big Creek No. 8 Station of the Southern California Edison Company were all furnished by the General Electric Company. It is this equipment which, for the first time in electrical history, will generate and control 220,000 volts, maintaining the leadership of the West in power generation, and supplying energy for the further development of Pacific Coast commerce and industry.

**General Electric Company**

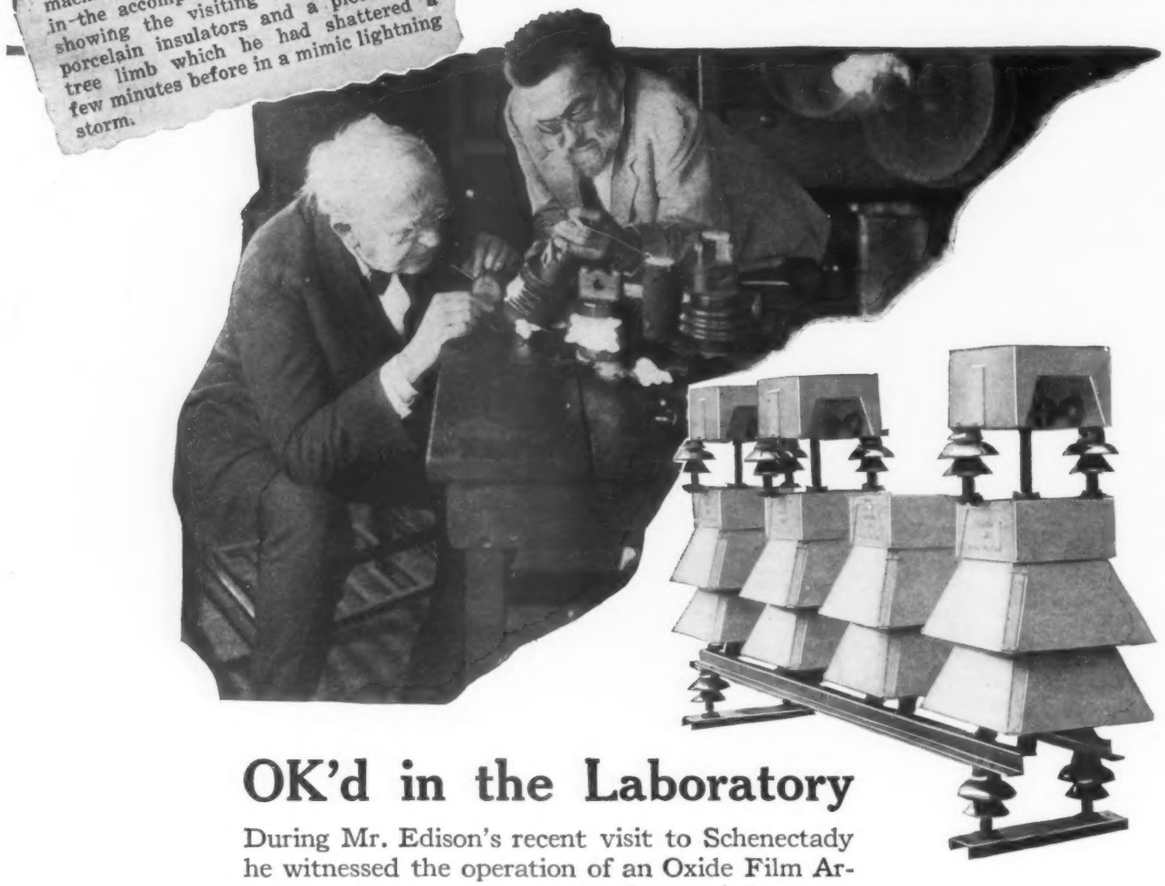
General Office Schenectady, N.Y.

Sales Offices in all large cities

95-585

**Pacific Coast Sales Offices: San Francisco, Los Angeles, Portland, Seattle, Spokane, Tacoma**
**Rocky Mountain Sales Offices: Denver, Colorado; Salt Lake City, Utah**

*Oxide Film Arresters—seven years of service is proof of their reliability*



Dr. Steinmetz gave an exhibition of his artificial lightning-making machine for Mr. Edison's benefit, and in the accompanying illustration he is showing the visiting inventor broken porcelain insulators and a piece of a tree limb which he had shattered a few minutes before in a mimic lightning storm.

## OK'd in the Laboratory

During Mr. Edison's recent visit to Schenectady he witnessed the operation of an Oxide Film Arrester used to protect a 2300-volt bus bar insulator when subjected to a discharge from the lightning generator developed by Dr. Steinmetz. When subjected to the same discharge without the arrester on the circuit, the insulator was shattered.

This test, using man-made lightning, is one of many which are made in the G-E Laboratory, where the Oxide Film Arrester was invented and perfected. Seven years of successful operating experience have thoroughly demonstrated the soundness of the theory, the thoroughness of the development, and the practicability of its design.

**General Electric Company**

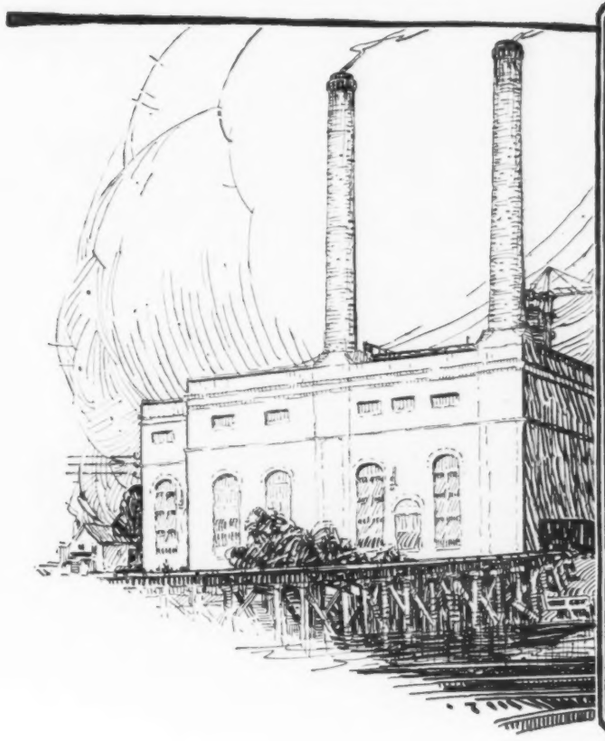
General Office Schenectady, N.Y.

Sales Offices in all large cities

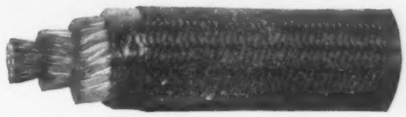
33E-31

Pacific Coast Sales Offices: San Francisco, Los Angeles, Portland, Seattle, Spokane, Tacoma
Rocky Mountain Sales Offices: Denver, Colorado; Salt Lake City, Utah

# *Cables that insure transmission service*

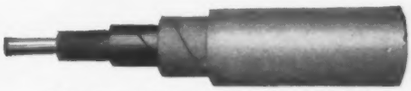


*High-tension, Double-braided Station Cable*

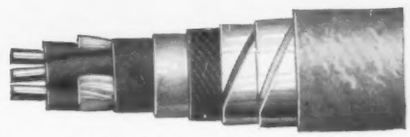


*Extra Flexible Apparatus Cable*

*Flameproof, 600-volt Switchboard Wire*



*Cable for series arc circuits, graded insulation*



*Band Steel Armored Underground Cable*

## High dielectric strength
## Resists moisture
## Uniform insulation
## Durable

These outstanding features of G-E Varnished Cambric Insulated Cable brought it immediate success after the initial installations just 20 years ago. Its application has since been widely extended.

G-E power-cable manufacture is based upon experience in designing the many varieties required by G-E equipment—a recommendation second to none.

Descriptive Bulletins will be sent you on request.

# General Electric Company

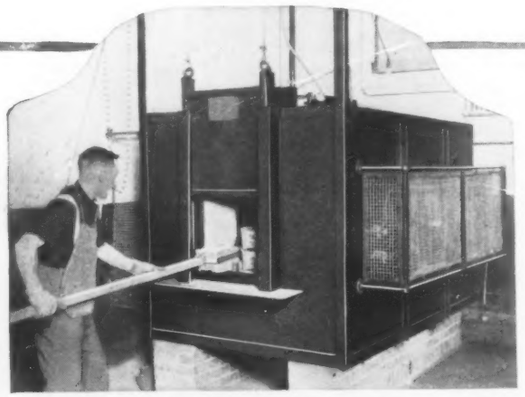
General Office
Schenectady, N.Y.

Sales Offices in all large cities

37-29

Pacific Coast Offices in: Los Angeles, Portland, San Francisco, Seattle, Spokane, Tacoma
Rocky Mountain Offices in: Denver, Colorado; Salt Lake City, Utah

# *From tiny Kodak lenses to huge turbine castings, electric heat is being successfully utilized for annealing*

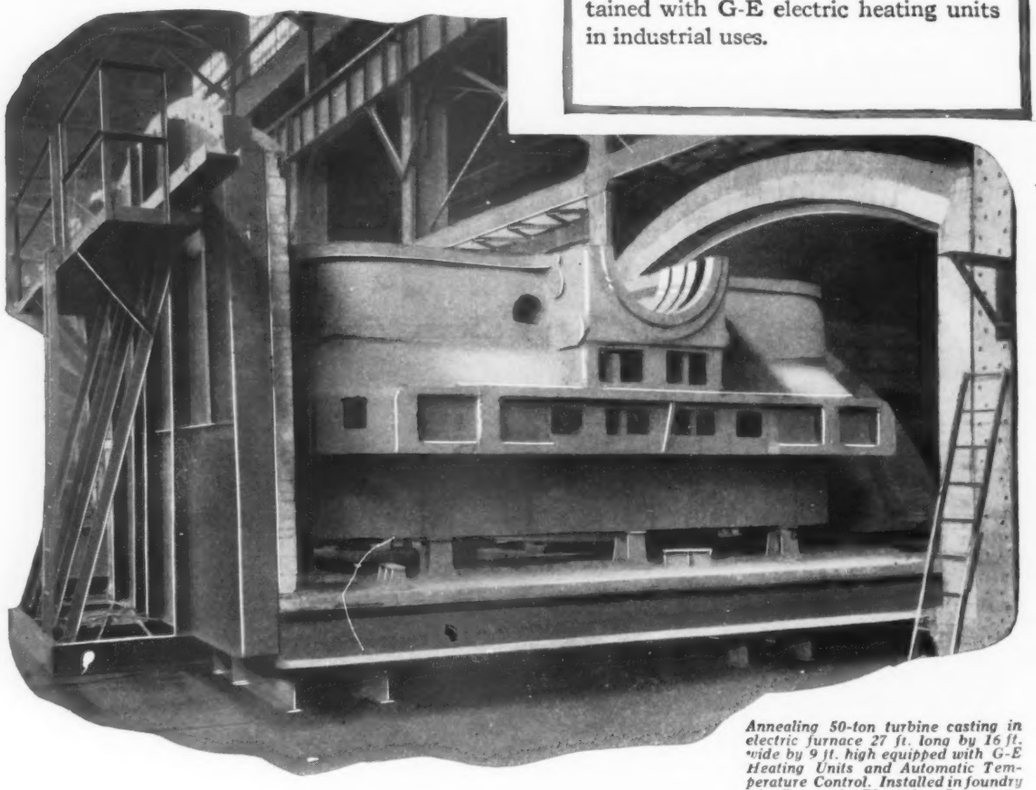


*Electric furnace equipped with G-E Heating Units and Automatic Temperature Control. Used for annealing Kodak lenses by Eastman Kodak Company, Rochester, N. Y.*

To perfectly anneal delicate glass lenses means a precise application and accurate control of heat attained only by electric heating units.

The automatic maintenance of a desired temperature and quantity, with proper distribution, has made electric heat the most positive and therefore the most economical method of annealing castings.

Producing quality material, duplicating the perfect anneal at will, improving conditions of the job, and effecting a saving throughout—this is the service obtained with G-E electric heating units in industrial uses.



*Annealing 50-ton turbine casting in electric furnace 27 ft. long by 16 ft. wide by 9 ft. high equipped with G-E Heating Units and Automatic Temperature Control. Installed in foundry of General Electric Company, Schenectady, N. Y.*

**General Electric Company**

General Office Schenectady, N.Y.

Sales Offices in all large cities

39-90

Pacific Coast Sales Offices: San Francisco, Los Angeles, Portland, Seattle, Spokane, Tacoma
Rocky Mountain Sales Offices: Denver, Colorado; Salt Lake City, Utah

# Vast Space?

**VAST SPACE?**

**Never! In fact, very, very little space is all that is needed for this type of breaker. But—if you had all the space of the ocean, you couldn't find a better circuit breaker, for its rated duty, than the Condit, truck type, F-11.**

**Husky, dependable—adaptable to individual requirements—and installed at a relatively low cost.**

**Condit truck type F-11's afford better service—use them and make the most of your space.**

**CONDIT ELECTRICAL MFG. CO.**
*Manufacturers of Electrical Protective Devices*
**Boston 27, Mass.**

**Represented by The H. B. Squires Co. in Seattle, San Francisco and Los Angeles**



**F-11**

4752

*Specifications: Single, two, three or four pole: 1200 amperes or less, 15,000 volts; 1600 amperes, 7500 volts; 2000 amperes, 4500 volts. Manually or electrically-operated. Interrupting capacity: 10,000 amperes at 15,000 volts.*

CONDIT

IF you haven't investigated the service of the Elpeco pole top switch—it might be well to drop a line now for the bulletin which tells why this improved design will give you more security at a saving in expense.

Note—the vertical break, carrying the arc upwards, away from the switch and line—the square shafts, eliminating keys where the insulator pins are bolted, insuring all phases openings simultaneously—the heavy babbitted pedestal bearings, making operation of switch easy—contacts are of circuit breaker design.

Built for manual or electrical operation.

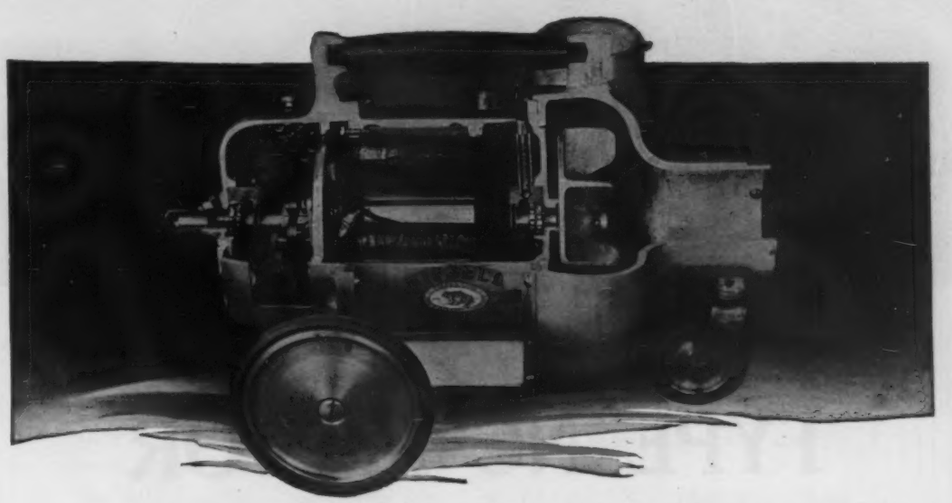
ELPEC

ELECTRIC POWER EQUIPMENT CORPORATION

PHILADELPHIA

WESTERN REPRESENTATIVE: C. E. INGALLS, RIALTO BLDG., SAN FRANCISCO, CAL.

SKF



# Self-Aligning Ball Bearings

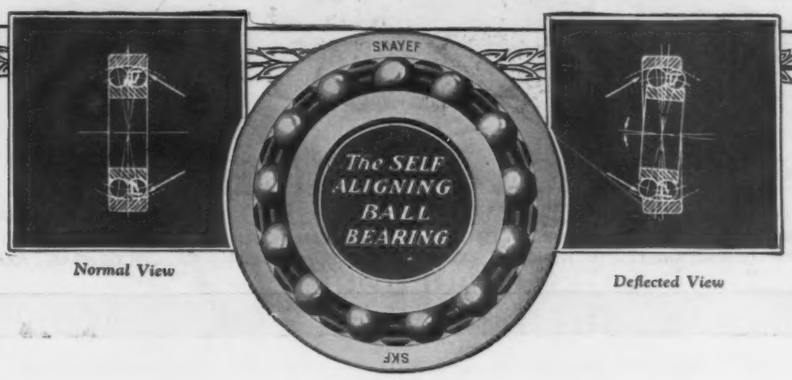
## Make Fractional H. P. Motors Trouble-Proof

MANUFACTURERS of motor-driven domestic appliances know that the bearings must be trouble-proof and of exceptional reliability to withstand the effects of abuse and neglect to which their machines are subjected in service.

As users draw no distinction between bearing failure and machine failure, appliance manufacturers are protecting their own interests by insisting on motors equipped with SKF marked self-aligning ball bearings. They are as dependable as a bearing can be made, require oil only once every three or four months, are practically frictionless, show no appreciable wear and automatically compensate for misalignment.

Adapt your fractional horsepower motors to market demands by equipping them with self-aligning ball bearings. They permit a more compact motor of given capacity and as they are practically frictionless, an easy-starting motor—so essential in many applications—is obtained.

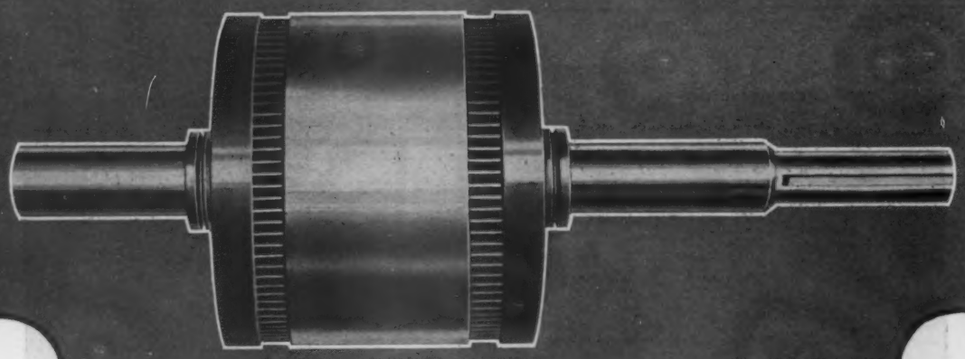
**SKF Industries of California, Inc., 115 New Montgomery St., San Francisco, Cal.**
**(A Complete Stock of Radial and Thrust Ball Bearings Carried in Stock)**
**Telephone Sutter 4196**




*Normal View* *Deflected View*

**BALL BEARINGS**
*The Highest Expression of the Bearing Principle*

# A Real Rotor



Like all the other parts of the

## TYPE NC MOTOR

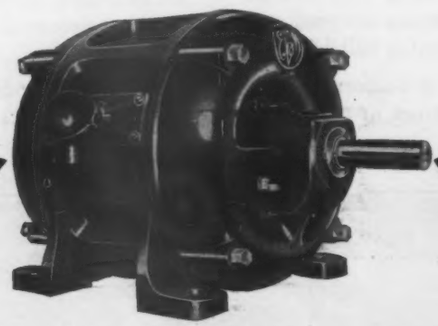
the Rotor is built heavier than commercial practice demands.

Note the size of the shaft extension for the pulley or gear. This extension is made according to standard practice. Then note the size of the shaft that rests upon the bearing.

The end rings are cast onto the rotor bars and these rings are heavy enough to stand overload currents without undue heating. In other words there is a large factor of safety.

The laminated portion of the Rotor is ground to a smooth finish. It will not catch dirt and interfere with the proper air gap.

Send for Catalogue 1045 and learn about the other features that help make the Type NC Motor a Better Motor.



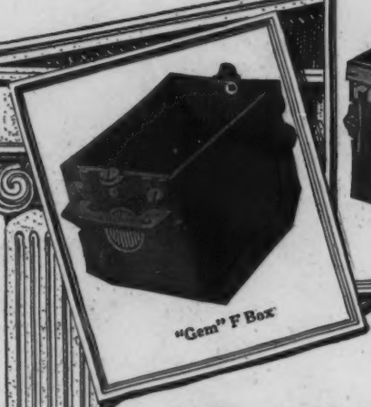
THE ELECTRIC CONTROLLER & MFG. CO.

CLEVELAND, OHIO

FOR SOUTHERN CALIFORNIA: O. E. THOMAS, AMERICAN BANK BLDG., LOS ANGELES

FOR STATES OF OREGON AND WASHINGTON: W. MONTELIUS PRICE, SEATTLE, WASH.

FOR NORTHERN CALIFORNIA: C. F. HENDERSON, CALL BLDG., SAN FRANCISCO


"Gem" F Box

"Gem" X Box

"Gem" B Box

# "Gem" Sectional Switch Boxes

Trade Mark

## Are Fool-proof and Trouble-proof

So simply and accurately are "Gem" Switch Boxes constructed that it is impossible to assemble them any way but the right way, either singly or in multiple form as gang boxes.

To build gang boxes you merely remove one side and add another unit, making it fast with one screw. The only tool needed is a screw driver.

It is impossible to make a mistake in putting the sections together because all sides are interchangeable. And all sections *must* fit snugly and rigidly. There is no other way to put them together.

Their extreme simplicity makes it easy to build "Gem" Boxes into a number of gangs right on the job and to install them quicker than any other make. This saves delays—reduces cost.

Furnished regularly in a smooth, heavy black insulating enamel finish which is thoroughly rust-proof, moisture-proof and acid-proof.

"Gem" Boxes are suitable for both old and new work. Ears extend ½ in. from body of box, affording ample room for setting screws into lathe or mounting board.

No trouble to install—no trouble *after* they are installed. The original and recognized *Standard* switch box. May we send you Catalog No. 29?

## Chicago Fuse Mfg. Co.

***Manufacturers of Switch and Outlet Boxes, Cut-Out Bases, Fuse Plugs, Automobile Fuses, Renewable and Non-Renewable Enclosed Fuses.***

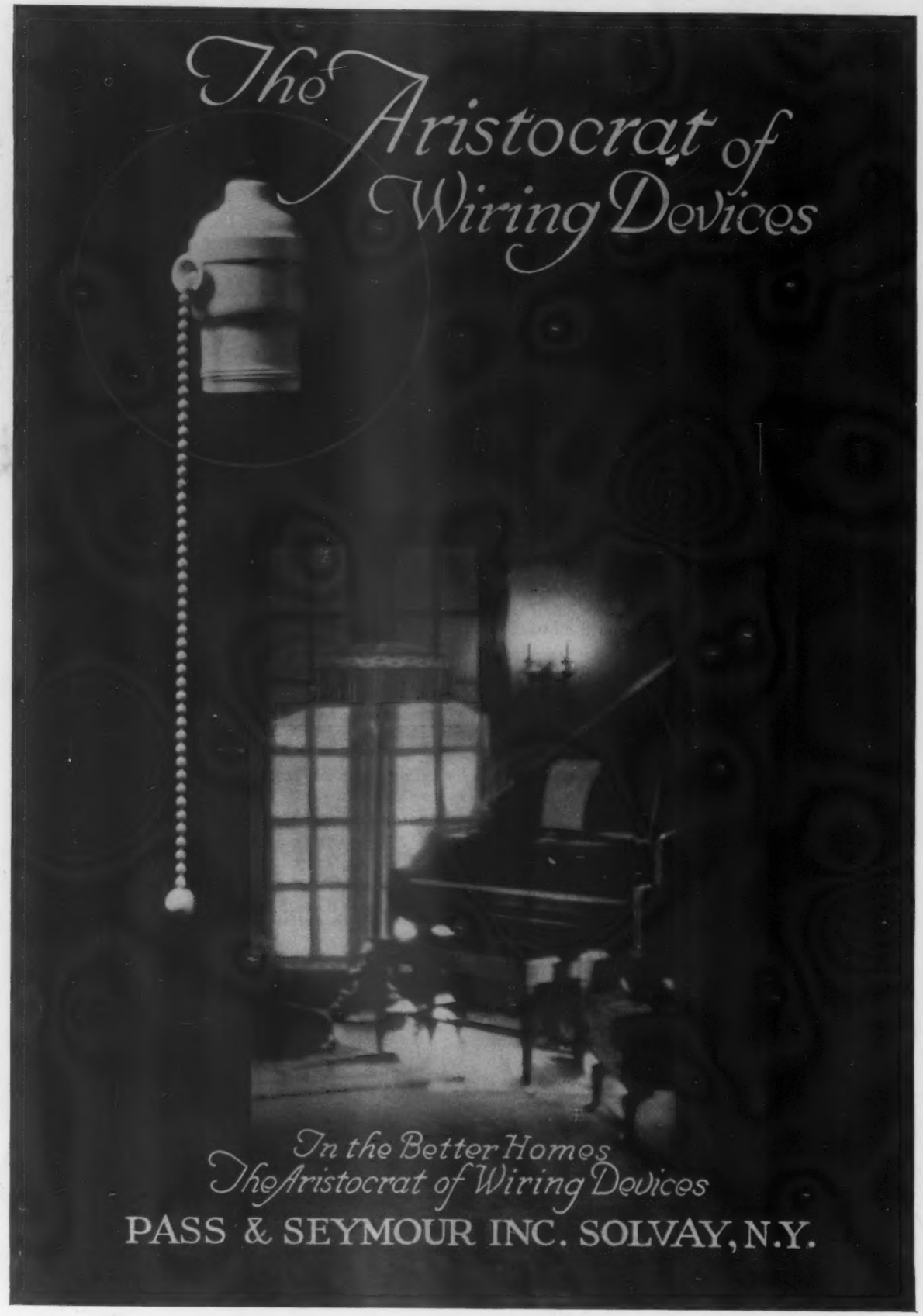
**CHICAGO** **NEW YORK**

Illinois Elec. Co., Los Angeles; Elec. Appliance Co., and Dunham, Carrigan & Hayden Co., San Francisco; Fobes Supply Co., Portland, Seattle, San Francisco and Oakland.

"UNION"

SWITCH and OUTLET BOXES

UNION


The Aristocrat of Wiring Devices
In the Better Homes
The Aristocrat of Wiring Devices
PASS & SEYMOUR INC. SOLVAY, N.Y.

# *The attachments on the Good Cleaner, America are used regularly, because they are easy to use*

Cleaner attachments put away in some obscure closet are usually there because they are hard to use or inefficient.

Attachments for The Good Cleaner, America, are designed for use, made easy to use, and accomplish their work most effectively. Their number is limited to those necessary for household use.

When The Good Cleaner, America, is being used with these attachments, the machine runs on the regular wheels, following the operator about as she moves from place to place around the room. This is much more convenient than having to stand the machine somewhere in the room and carry it about to reach various places or pieces of furniture.

This convenience is but one of the features that appeal to buyers and make sales of the America easy.

Ask our nearest distributor for a full description of The Good Cleaner, America, and our dealer's plan.

## The Wise-McClung Mfg. Co.

480 Eighth Street

New Philadelphia, Ohio

**WESTERN DISTRIBUTORS**

**Western Agencies, Inc.,**
**711-713 Mission St.,**
**San Francisco, Cal.**

**Mfrs. Representatives Co.,**
**74 New Montgomery St.,**
**San Francisco, Cal.**

**The Salt Lake Hdwe. Co.,**
**Salt Lake City, Utah**

**Burghardt & Hauff Elec. Co.,**
**1007 First Ave.,**
**Seattle, Wash.**

**Electric Service Co.,**
**175 Park St., near Yamhill,**
**Portland, Ore.**

**C. E. MacNichols,**
**Northwest Field Manager,**
**c/o The Moore Hotel,**
**Seattle, Wash.**

FOR over a quarter of a century R & M Fans have been bringing comfort and joy to electrically equipped homes the world over. And a large percentage of the first fans, built more than twenty-five years ago, are still in use, giving the same dependable service they gave when new.

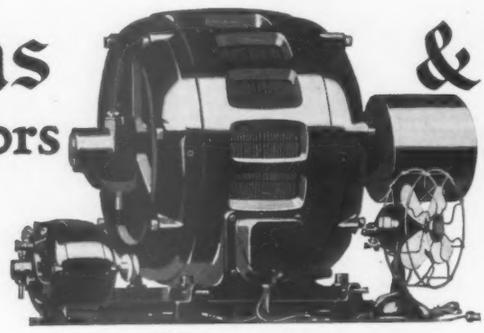
Because R & M Fans do invariably give such long, reliable service, many jobbers and dealers have stuck to the R & M line throughout their business lives. They know that R & M quality reduces service expenses to an almost negligible amount, and makes permanently satisfied customers for the jobber and dealer.

The 1923 R & M catalogue for dealers is ready for distribution. If you haven't received a copy, ask for fan catalogue number 1203.

**THE ROBBINS & MYERS COMPANY**
**Springfield, Ohio** **Brantford, Ontario**

*Pacific Coast Office, 701-702 Rialto Bldg., San Francisco*

**Robbins & Myers**
**Motors** *and Fans*



# "1900" CATARACT WASHER

THE exclusive *double action* (the famous Figure 8 movement) of the water in the 1900 CATARACT is not a mere selling argument—but a *buying reason* that any woman will immediately appreciate. And it is only one of seventeen supreme merits peculiar to this washer alone.

## *Who Buys This Washer?*

THE 1900 CATARACT WASHER satisfies the woman who wants the most efficient washer, regardless of price. And it satisfies—as no other washer does!—the woman who watches every penny and demands economy of operation, washday after washday.

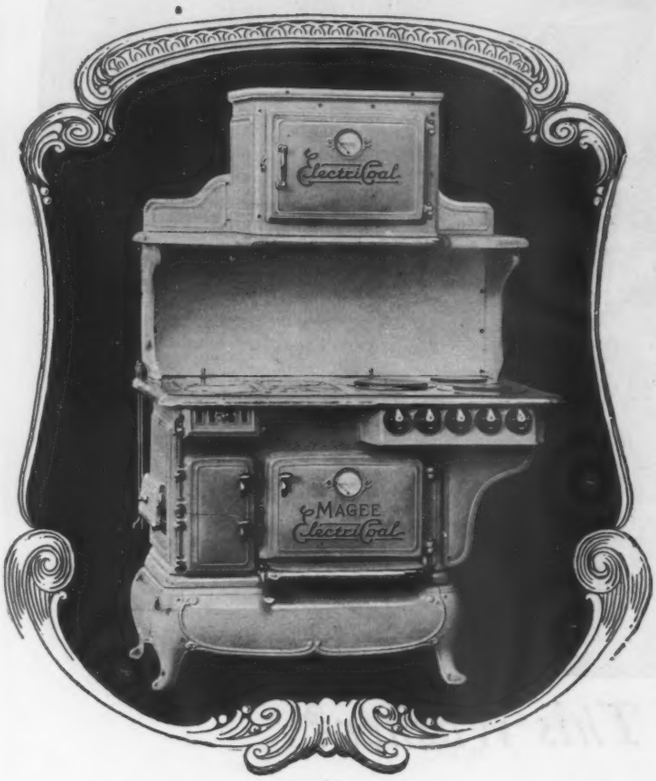
Dealing in two or three different kinds of washers at the same time is uncertain business. But, big money is due the dealer who specializes on one supreme washer that satisfies all classes.

The 1900 CATARACT dealer proposal, with its interesting advertising-cooperation plan, is probably the most favorable you ever considered. Asking for all the facts may be your first step toward greatly increased profits.

1900 Washer Company, Binghamton, N. Y.

# MAGEE ElectriCoal

## The Range of Double Service ----and it Sells




**The Magee ElectriCoal is two complete ranges in one compact form** doing full duty both as a coal range and as an Electric Range. Either fuel can be used at the same time or separately as desired.

A complete Electric Range including 3 cooking units, a broiler and a large Electric oven or fireless cooker. The units are made by the Edison Electric Appliance Company, Inc., which mean reliability and service.

A perfect coal range for cooking, baking and heating water, has the large Magee oven which is heated on five sides, and is equipped with all the special Magee improvements.

The Magee ElectriCoal is made in gray enamel (por-cel-a) finish or in ebony black, and is the finest range ever produced.

WHEN you sell a Magee ElectriCoal you make real money for yourself — and a satisfied customer — that will sell another for you.

*Write for full information*

T. G. ARROWSMITH COMPANY
180 New Montgomery St. San Francisco, California

MAGEE FURNACE COMPANY
38 Union Street, Boston, Mass.

# U. S. MOTORS

## —the motors with quality built in

U. S. MOTOR manufacturing methods have always been high and fine; but with our new factory facilities they are much better and more exacting than ever before. The experts whom we entrust with the work of building quality into these motors have now literally outdone themselves. The fruit of their efforts, the success they have accomplished, is revealed in the U. S. Motors that have been produced for months past.

We should like to acquaint you with the distinctive features of U. S. Motors. We believe the sound manufacturing principles, the excellence of workmanship and the integrity of our Organization are factors that you should like to know about.

**Send for Motor Literature**

**U. S. ELECTRICAL MFG. CO.**

Largest motor builders in the west since 1906

When in Los Angeles
Visit Our New Factory

LOS ANGELES

San Francisco Branch
217 Rialto Building

# Brill Rail-less Car for Los Angeles

## Seating Capacity, 30

Shortly ago the Brill "Rail-less" Car illustrated was shipped to the Los Angeles Railway Company.

It was constructed according to standard specifications, having an all-steel frame and including T-section side posts fitted with Brill "Renitent" spring brass post casings. These hold the lower side sash under pressure and eliminate objectionable sash rattle, at the same time insuring a sash fit which is both dust and air tight.

Two (2) 25-hp. motors at 550 volts are mounted amidship and drive the rear axle through a propeller shaft equipped with universal joints.

Brill "Rail-less" Cars measure 23 ft. 2½ in. long over vestibule, 7 ft. 6 in. wide over posts and 6 ft. 8 in. high from the floor to underside of carlines.

The chassis was specially designed for electric rail-less car service.

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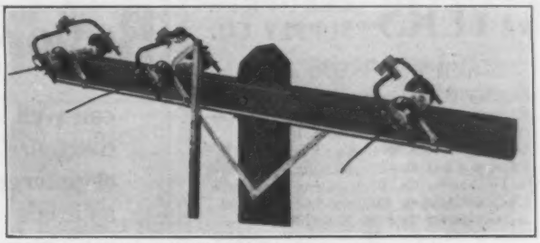

K-P-F type L-115—4500-V. Bolts to the cross-arm. Line wires can be dead ended directly to it.

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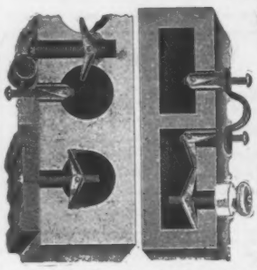

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Manufactured By
McGILL MFG. Co.
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Fully protects Incandescent Lamps against Breakage and Theft. Locks on with a key. Pays for itself for every lamp saved.

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**ADD 5 WORDS** for box number address in undisplayed ads, if replies are to any of our offices. No additional charge for forwarding replies.

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FOR SALE—1—Automatic, 3-phase, 2,200-volt, 10-kw. Regulator complete with all necessary accessories. For further information address A. E. Gilkey, City Electrician, City of Roseville, Calif.

## SELLING OUT

We are going to discontinue our department of

## Lighting Fixtures

The stock includes a complete line of ceiling and wall lights; bedroom, bathroom, dining room, living room and kitchen fixtures; elaborate indirect lights for clubs, hotels, apartments, etc. These fixtures are new goods—the latest types in construction and design. We invite you to inspect them. Our greatly reduced prices will convince you that this is a real opportunity. Write us for catalogue and prices.

**de Jongh & Cochran**
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Electric Motors and Generators
Electric Control Equipment
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Motor Trucks and Trailers
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Used Machinery of Various Kinds

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JOURNAL OF ELECTRICITY AND WESTERN INDUSTRY

and get in touch with the man who has the equipment for sale

## 3000 tons 60 lb. RELAYING RAIL

A. S. C. E. Sections and Angles at Girard, Pa.

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**For Sale at Sacrifice—Practically New Motors**
60-hp., Westinghouse 8-pole, 440-volt, 3-phase, Sw. Bd. and Compensator.
25-hp., Westinghouse 4-pole, 220-volt, 3-phase, and Compensator.
30-hp., G. E. 440-volt, 3-phase, and Compensator.
Acme Pump & Electric Co.
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**POSITIONS WANTED Ads**

reach employers of technical men on the Pacific Coast. Use the

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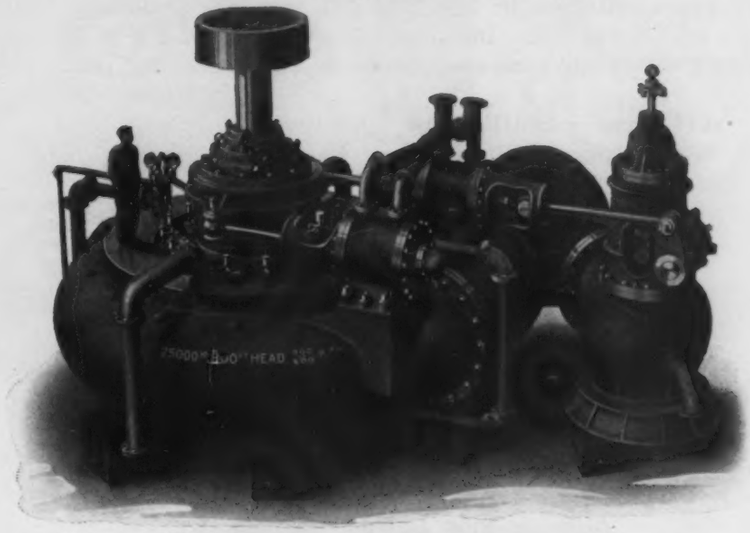
## *At Your Service—*

A service wherein the man who is seeking a position or the man who is desirous of obtaining trained men; where information can be found concerning either the purchase or disposal of new and used electrical equipment. The purpose of the *SEARCHLIGHT* section of the *Journal of Electricity and Western Industry* is to render this service. It simply remains for the men in the electrical industry in the West to apply this service to their needs.

**For Every Business Want—Think *Searchlight* First**

PELTON

# The Highest-Head Reaction Turbines now Operating are Pelton-Designed and Built



## A Higher-Head Turbine

now contracted for, will also be

## Pelton-Built

**And Will Embody the Most Recent Improvements in Design of Both**

**The Pelton Water Wheel Co.**

And Its Associated Company

**The I. P. Morris Department of Wm. Cramp & Sons Ship & Engine Building Company**

This unit, which will develop 35,000 H.P. under a head of 857 feet, will be installed at the Oak Grove plant of the Portland Railway Light & Power Company, on the Clackamas river, 53 miles from Portland. It will resemble the Kern River No. 3 turbines, one of which is shown above, but will include such distinctively I. P. Morris features as disk-type guide-vanes, the Moody spreading draft-tube, and the Taylor grease-gun. It will also be equipped with the newly-developed Pelton rubber seal rings.

This is only one instance of the benefit accruing to power companies and power users generally from the recent association of these leading manufacturers of hydraulic prime-movers, since the embodying of the above mentioned and other exclusive features would not have been possible for either organization, working alone, still less for any other manufacturer.

**The Purchaser of hydraulic equipment, who desires the best in design and workmanship, must come to**

## THE PELTON WATER WHEEL CO.

*Hydraulic Engineers*

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*Or Its Associated Companies*

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I. P. Morris Department
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(1) Line of Rubber and Friction Insulating Tape
(2) " " Electrical Heating Units
(3) " " Automatic Electric Water Heaters
(4) " " Multi-Socket Receptacles
(5) " " A.C. & D.C. Motors
(6) " " Lighting Fixtures
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**San Francisco**

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(1) Line of High Tension Transmission Switching and Protective Equipment

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(1) Line of Friction Tape
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**Entire West**

(1) Line of Renewable Fuses
(2) " " Electric Fireless Cookers
(3) " " D.C. & A.C. Motors and Generators
(4) " " Motor Controllers
(5) " " High Tension Switches
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Tower members assembled for immediate shipment to comply with customer's construction program.

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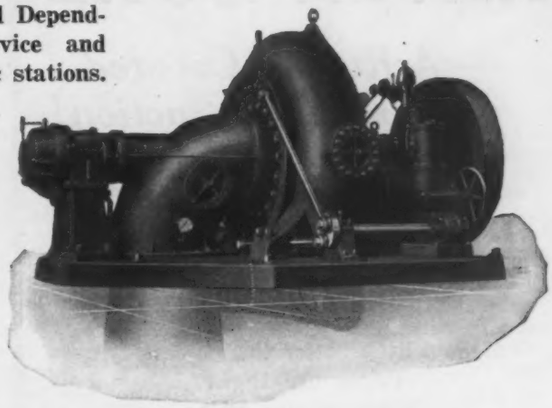
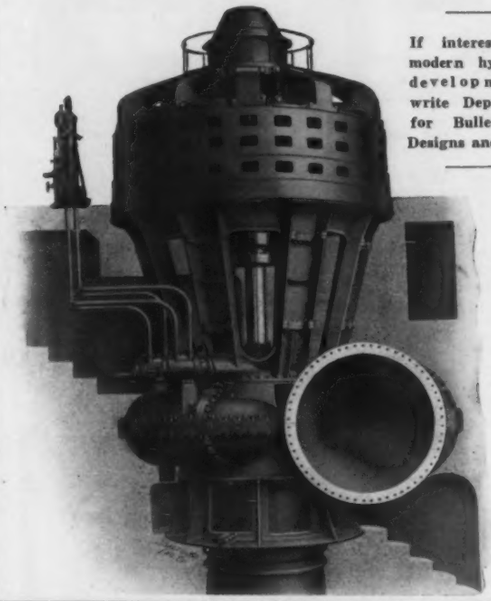
**Have an established reputation for Economy and Dependability which insures the Continuity of Service and Hydraulic Efficiency so essential to hydro-electric stations.**





If interested in modern hydraulic developments, write Dept. "H" for Bulletin of Designs and Data.

Accompanying illustrations show representative scroll case Francis type Hydraulic Turbine Units of vertical and horizontal shaft type for driving direct connected generators.

## S. MORGAN SMITH CO.

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| CHICAGO 76 W. Monroe St. | SAN FRANCISCO 461 Market St. | PORTLAND, ORE. 224 Pine St. | ATLANTA, GA. Citizens&So.Bk.Bg. |

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REGISTERED.

# New Glass Insulators for Medium Voltage Power Lines
## 2300—15000V.

Standardized types, with the best practice concentrated in three types for medium voltage power lines, now makes available all the advantages of glass insulators with the greatest economy.

Glass for insulators means great dielectric strength, freedom from deterioration, uniform and non-porous material, moderate cost. Secure these advantages, together with the economy of a standard product, in construction of medium voltage lines, by using Hemingray New Power Insulators.

Bulletin will be sent on request.

**Hemingray Glass Company, Muncie, Ind.**

# RAVEN CORE

***—A Rubber Covered Wire of Distinction!***

**Made by a house of standing.**
**Specified by all the leading architects.**
**Used by the Contractors who do the better grade of work.**

**Made a little better than necessary**
**Prices are Right**
**Deliveries are Right**
**Why not ask us about it?**

**New York Insulated Wire Co.**
**Main Office: NEW YORK**
**Factory: WALLINGFORD, CONN.**

Western Representatives:
ILLINOIS ELECTRIC CO., Los Angeles, Cal.

# Our Representatives
in

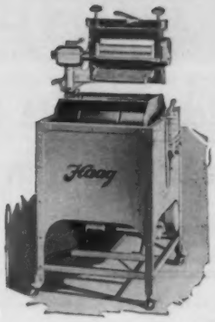
**New York** **Philadelphia**
**Chicago** **St. Louis**

are in constant touch with Eastern manufacturers who often ask to have good Western Representatives recommended.

We are in a position to render Western Distributors and Manufacturers' Representatives a distinct service in making connections that will produce bigger and better business.

Write today and tell us in what lines you are interested and our representatives will place you in touch with the manufacturer making exactly what you want to sell.

**Business Manager**
**Journal of Electricity and Western Industry**
**Rialto Bldg.** **San Francisco**




## A Tribute to a Marvelous Washer

***270 Years of Service from One Haag Machine***

Pen Yann, New York, Sept. 27, 1922.

Haag Brothers Co., Peoria, Ill.

Dear Sirs:—I want you to know about the excellent service my Haag has given me. I purchased my machine March 10, 1917 and have used it continually. Since that time I have done FOURTEEN THOUSAND washings and the machine is still in good condition.

Yours truly,

Chapman Laundry, Wm. Chapman, Prop.
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## 14,000 Washings—and Still "on the Job"

More washings than the average family would do in over two and one-half centuries. Yet even such a record should not cause surprise because three things guarantee long service—

1—Into "HAAG" washers go the finest materials we can possibly buy. 2—The workmanship is that of trust-worthy employees of long standing. 3—The Haag brothers (Albert and George) personally inspect every machine.

Write for literature and prices.

**In addition to the Haag Oscillator the COMPLETE Haag Line includes Haag "Cabinet" (cylinder) and "Blue Ribbon," "Nu-Way" and "Twin Tub" dolly types; electric or belt power.**

## HAAG BROS. CO., Peoria, Illinois

**If no one controls the sale of this complete line in your territory get it yourself—before some one else does.**

Lots of us look death in the face frequently and think nothing of it. Electrical workers come very close to high voltage all their working day, and because they know it's there, and know just how close they can come to death's skirts and be able to walk away, they no longer consider their lives are in danger.

The life insurance man has to remind them of mortality rates.

Lots of people who use meters are oblivious to present-day improvements and attainments just because they "never happened to think of it that way." It has become a habit with them to get along with their present types of meter equipment, and we, like the life insurance man, have to break into set habits with facts on accuracy, and long life, and costs, and revenue.

We notice, too, that the more set in his belief a prospective user is, the harder our demonstration hits him.

We like to go into details about the design, manufacture and performance of Duncan Meters, and we have some very interesting demonstrations of superior service. Ask us for data in as much detail as you care to receive.

## Duncan Electric Manufacturing Co.

Lafayette, Indiana

# DUNCAN

*The most up-to-date authority on high tension practice of today*

# Protective Relays

— BY —

VICTOR H. TODD

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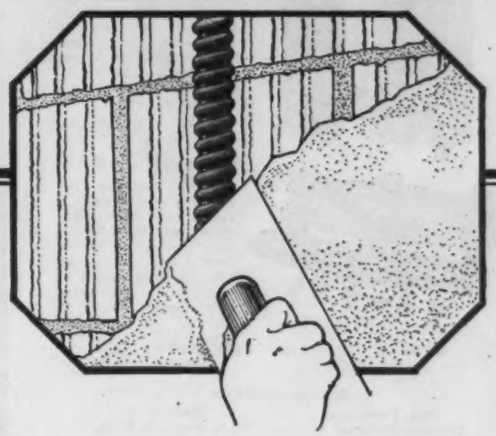

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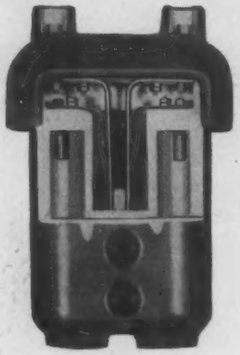

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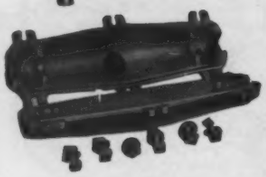

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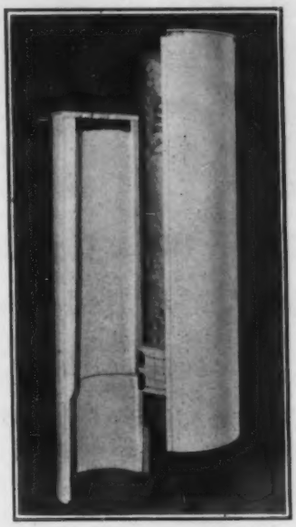

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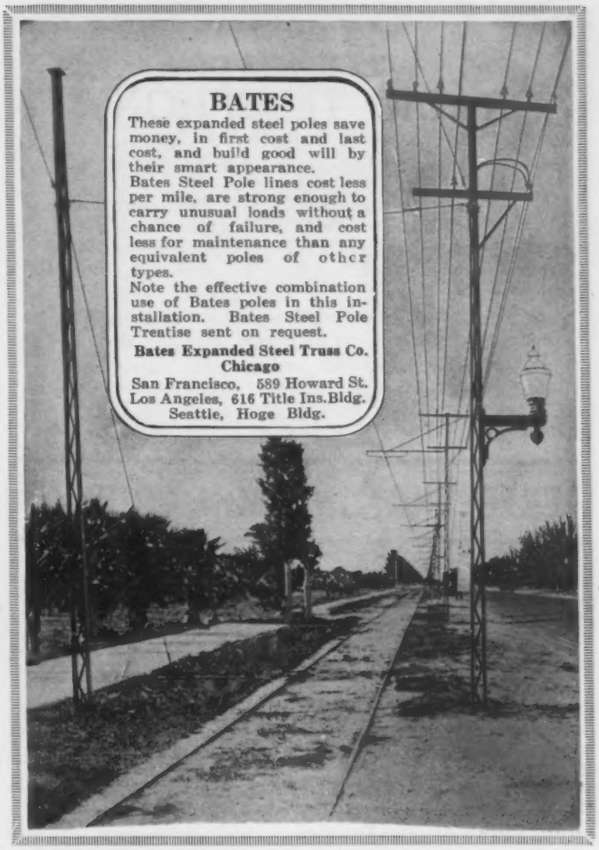
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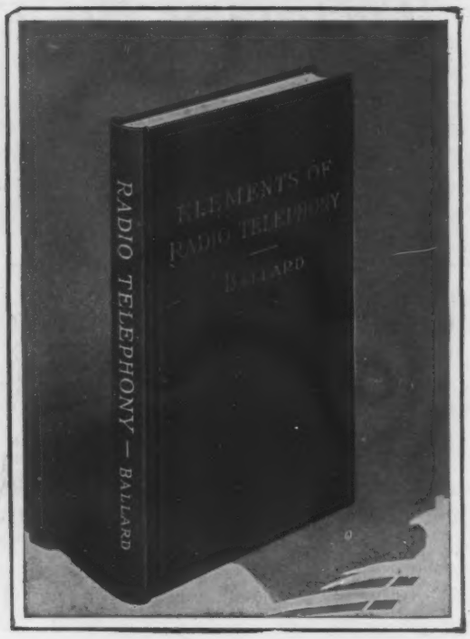


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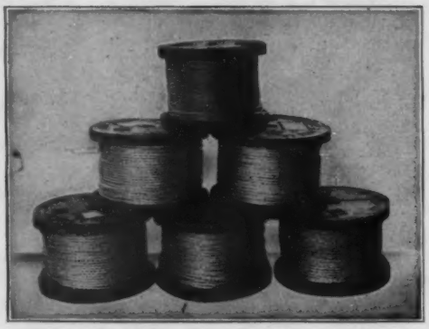

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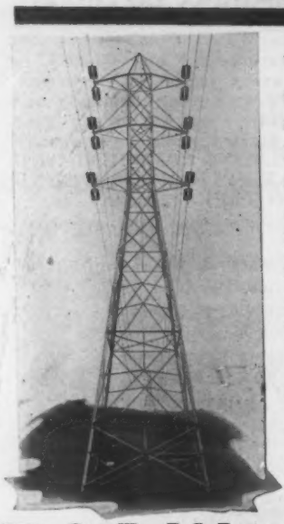

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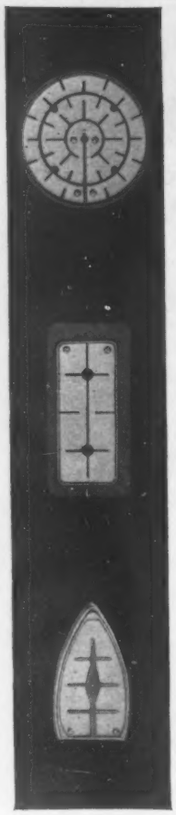

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—while you unscrew every plug in the box

—and finally have to test them all

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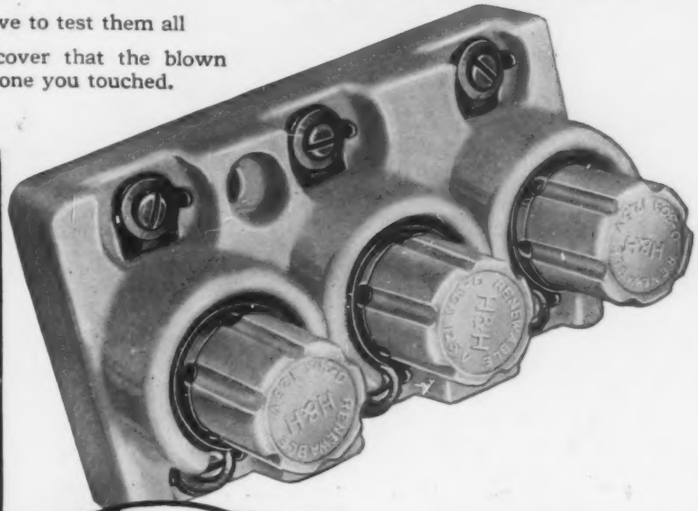

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| 66-335 | 15 Amp. | FC - 335 |
| 66-337 | 20 Amp. | FC - 337 |
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